The IRON AGE

February 11, 1960 A Chilton Publication The National Metalworking Weekly

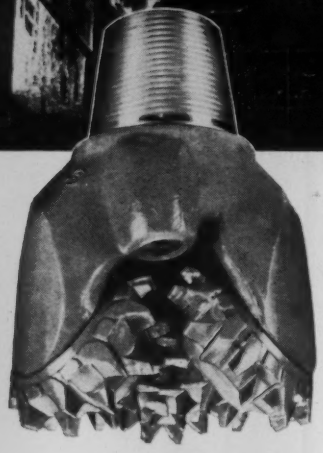
Low-Cost Process Diffuses Chromium Into Steel P. 143

More Metalworking Moves by Air – P. 105

Galvanized Cracks The Auto Market – P. 121

Digest of the Week – P. 2-3

Photograph courtesy of Pacific Forge, Inc., Fontana, Calif.



Of course Pacific Forge is fussy about surface condition

On drill bits for Security Engineering Division, Dresser Operations, Inc., Aristoloy round-cornered squares meet this forger's stringent requirements. In-plant scarfing and grinding prior to forging have been eliminated—rejects caused by surface defects have been reduced to a minimum.

The secret—careful control of Aristoloy Steels from electric furnace melting to final rolling operations. The result—alloy steels of prime forging quality—and uniform chemical, structural, and hardenability characteristics that satisfy the critical use requirements for rock drill bits.

For complete information about Aristoloy structural alloy, stainless and carbon steels in leaded or standard analyses, contact the local Copperweld representative in your nearest large city. Or write for complete information.

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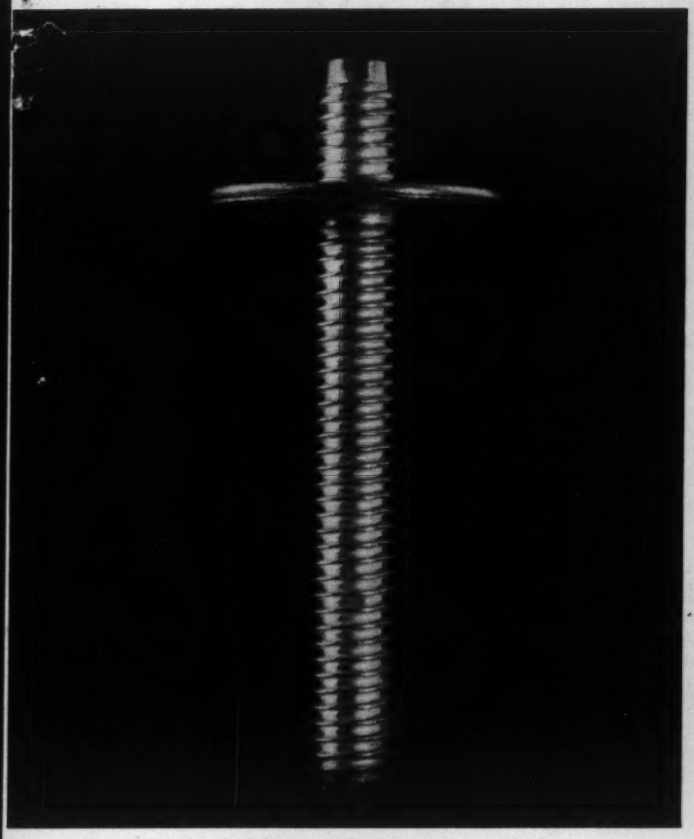
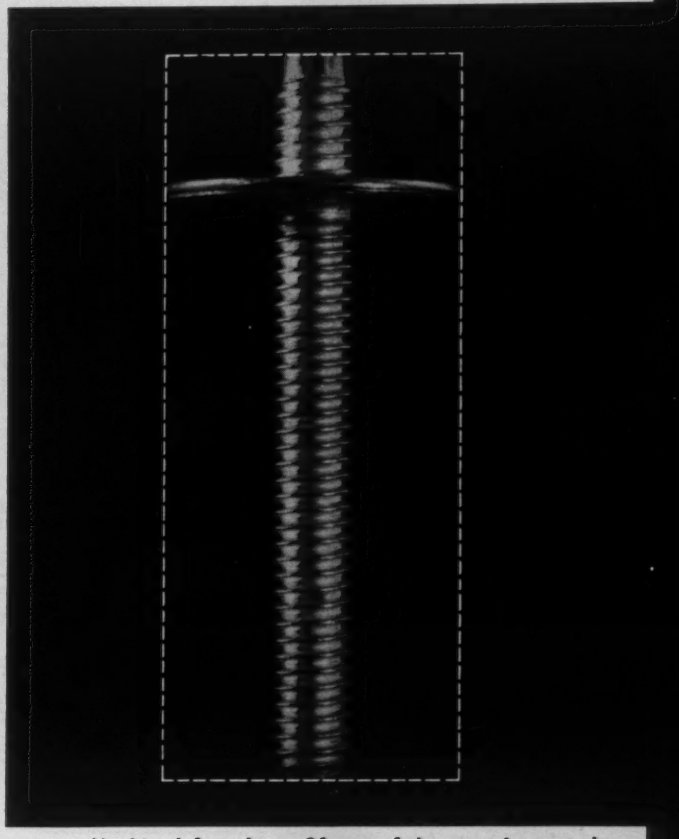
ARISTOLOY STEEL DIVISION • 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

This "impossible" screw is now being cold-headed



Now cold-headed from steel wire at one-tenth the cost.



Machined from bars, 91 pct of the steel is wasted.

This automobile window-adjusting channel screw is being produced from cold-heading wire at one-tenth the original cost. Formerly machined from bar stock with a 91 per cent waste, this special screw is upset to three-and-one-half times the diameter of its shaft.

Bethlehem Steel has played a vital role in the progress of cold-heading by supplying steel wire in the proper grades and analyses, and by recommending the correct heat-treatment.

You may now be machining parts that can be cold-headed, at less cost—and with improved properties. By no means do we say that we can supply cold-heading wire for every one of them. But our experienced metallurgists have helped many users of cold-heading wire to improve their results. Perhaps they can do the same for you. Our nearest sales office will welcome the chance to talk it over. Or get in touch with us at Bethlehem, Pa.

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Indexed in Applied Science & Technology Index and Engineering Index.

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THE IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Second class postage paid at Philadelphia, Pa. Price to the metalworking industries only or to people actively engaged therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $25; other Foreign Countries, $35 per year. Single Copies 50¢. Annual Review Issue $2.00. Cable: "Ironage," Philadelphia.

The IRON AGE

February 11, 1960—Vol. 185, No. 6

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NEWS ARTICLES

AIR FREIGHT

Continues to Climb — A new record for ton-mile shipments of air freight was set in 1959. The industry

expects business to increase at a faster rate in the 1960's. New equipment, lower rates, and a new approach to selling air cargo service are the keys to more business. P. 105

DEPRECIATION REFORM

Prospects Encouraging—Industry presented its case for depreciation reform ably, says Rep. Mills, chairman of House Ways and Means Committee. But changes must be viewed against the overall tax picture. P. 107

ALUMINUM

Market Plans — Alcoa makes some major moves aimed at developing the mass markets. And sales staff is reorganized along market, rather than product lines. P. 108

VENEZUELA OUTLOOK

Signs of Improvement—The first

Metalworking

◀ COVER FEATURE

CHROMIUM DIFFUSION: A new process from Alloy Surfaces Co., Inc., diffuses chromium into the base metal and creates an alloy case, not a coating. Processing takes place in setups like this American Gas Furnace Co. unit. P. 143

try at democracy in this South American nation had its pains, and still does. But the climate for business is improving, although it will take time. P. 110

INDUSTRIAL MOVIES

Are Growing — The tab for industry movies last year was $171 million. It will be up again. P. 112

FEATURE ARTICLES

PRODUCTION WELDING

Small Parts—50 welds per minute is par for the course with a new capacitor-discharge welding machine. The unit handles coated metals, dissimilar materials and even delicate parts on a mass production basis. The process discourages excess heat from developing in the weld zone. P. 146

ADDING MAGNESIUM

To Reduce Sulphur Content — Recent studies show that magnesium effectively reduces sulphur content in steels. Other findings point up marked improvements in reduction of area and impact strength. Tests show that magnesium powder, diluted with lime, can be successfully injected into steel. P. 148

LAPPING MACHINE

Into Production Lines—One auto maker now uses lapping machines to polish camshaft journals for automobile engines. Putting these units into production lines required careful planning. The goal: Process parts through lapping setups with a minimum of handling. P. 150

BETTER LATHE CONTROL

From New Clutches—A compact electromagnetic clutch control helps step up performance of a new line of small hand turret lathes. The clutches start, stop, change speed, reverse and brake the main lathe spindle. They also insure accuracy of speed and torque. P. 154

HIGH-STRENGTH ALLOY STEEL

For Missiles — A new high-temperature alloy steel has been developed that possesses good machinability, ductility and weldability. Its main use will be in rocket motor cases. These cases have yield strength levels in the range of 225,000 to 235,000 psi. P. 156

MARKETS & PRICES

AUTOMOTIVE

Battle Against Rust — Trend toward unitized construction, accelerated by the introduction of the new compact cars, has changed the problem of rust from one of customer complaints, to one of safety. There are several solutions. Ford and GM use galvanized steel for strategic structural parts to retard corrosion. P. 121

WASHINGTON

Defense Waste?—Fifty pct of defense spending is simply pump-priming, Rep. Whitten charges. There's too much effort just to keep everybody happy until after the election, he adds. P. 125

STEEL SUMMARY

Inventory Factor—Steel users are determined not to build high stocks of steel. This will result in the steel operating rate dropping earlier than expected and also an easing in some product demand. P. 197

PURCHASING

New Service — Gray Iron Founders Society, Inc., and Design for Industry, Inc., have instituted a new service that will help solve founders' problems. P. 198

NEXT WEEK

MINOR METALS

Wider Markets — Technical developments are creating new areas of use for the minor metals. Next week's special report tells of the opportunities that have been uncovered. (Calumet & Hecla photo)

BROWNING CRANES

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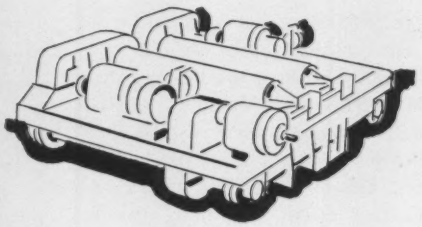

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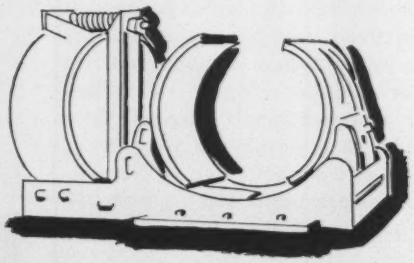

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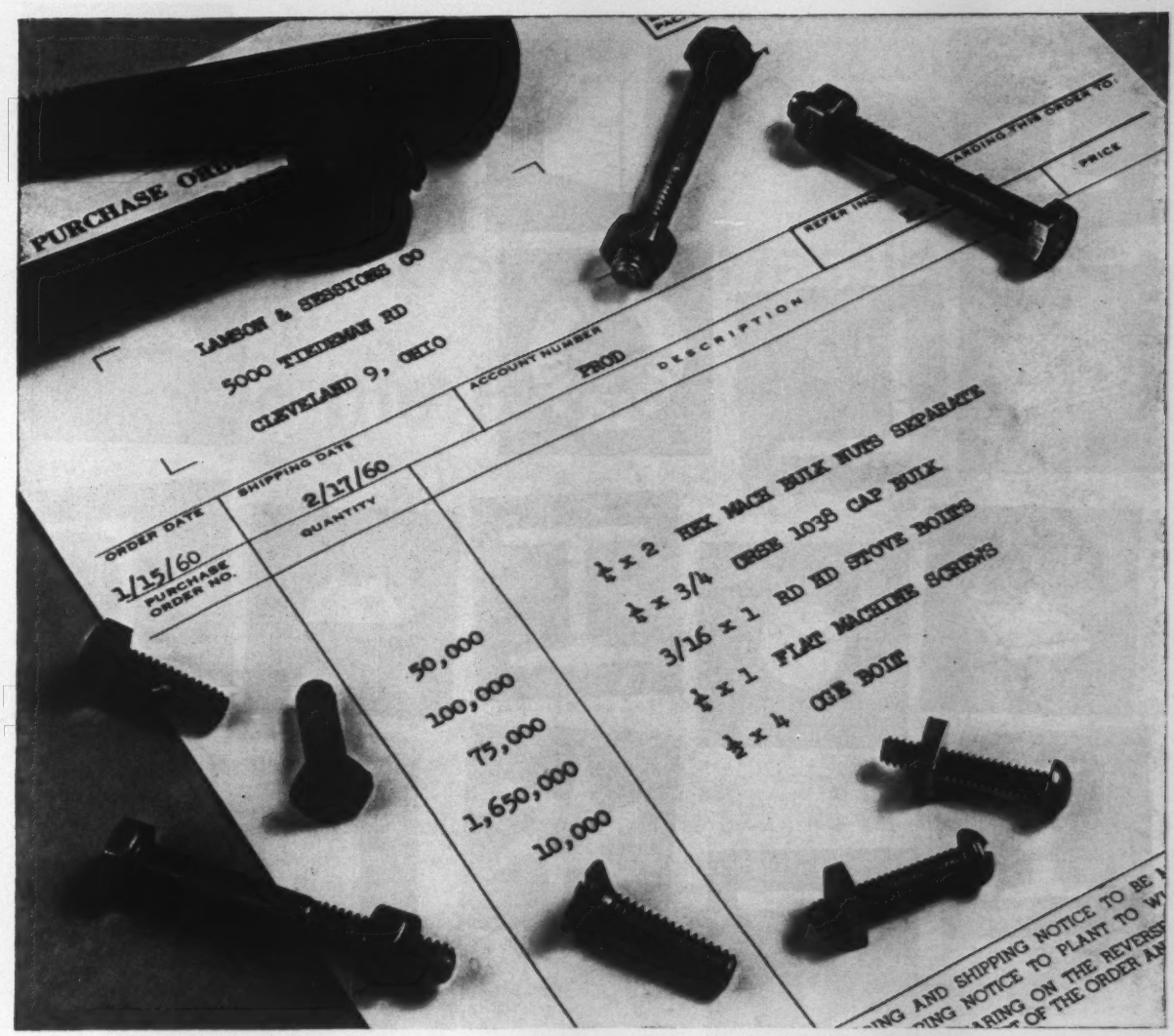

Where to get fasteners when things get rough

In recent months we have been swamped with orders from companies whose "dependable source of supply" had suddenly vanished.

We value these new customers, naturally. Maybe you are one of them. Nevertheless, it's Lamson policy to take care of old customers first. It's an important way of putting meaning into the word "service".

If you buy fasteners in quantity, give serious consideration to making Lamson & Sessions your prime fastener source. Then you will have the best protection available when things get rough.

Why L & S customers are confident customers:

- Production and back-up stocks at *four* fine plants—located to serve you from Chicago, Cleveland, Kent, Ohio and Birmingham, Alabama.
- Complete fastener line—to give you one-order, one-shipment, one-invoice economy.
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- A 94-year history of continuous production and service.

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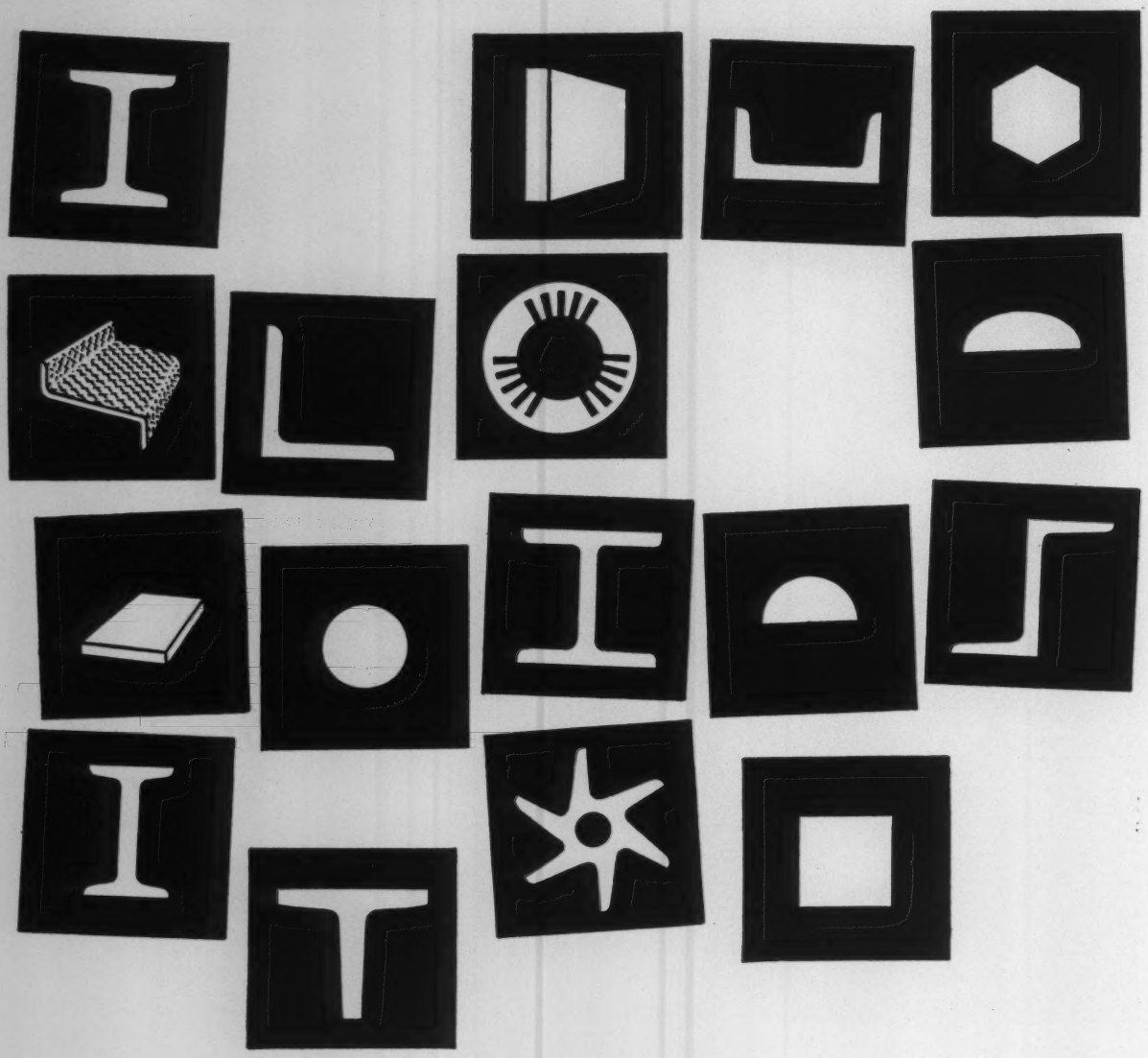

THE METALOGICS OF CARBON STEELS

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The Defense Hassle: Are the Bosses Correct?

General Eisenhower let go last week at generals who are criticizing his posture on defense. He was a little sarcastic in his remarks. But he didn't question anyone's patriotism.

Some politicians are using defense as a political issue. But others, such as Senator Symington, have been hammering away at the Administration so long they should be classed as honest zealots.

Many senators and representatives, regardless of party, are a little confused today about where we stand in relation to the Reds. Experts like N. Y. Times military editor Hanson Baldwin are not completely sure we are doing an adequate job in matching and competing with the Russians.

The same people who one week think we are going great guns are not so sure the next week. And the label "Second-rate power" is more than a cliche. To some intelligent people it is a horrible possibility.

Military leaders whose knowledge is broad and whose motives cannot be questioned believe we might not be able to deter the Reds if they took the fatal step. Some of these people suspect budget-balancing gets more attention than adequate defense planning.

What does all this mean? It means simply that many people in and out of government—and military—are confused. It does not mean they are attacking General Eisenhower or their government. Nor does it mean that they are selling the nation short.

It is hard to keep politics out of such a sensitive question as adequate defense—and space progress. Most senators try to do so. They would be the last to suggest that partisanship does not play a little part in their arguments. But they do have the right—and ability—to criticize.

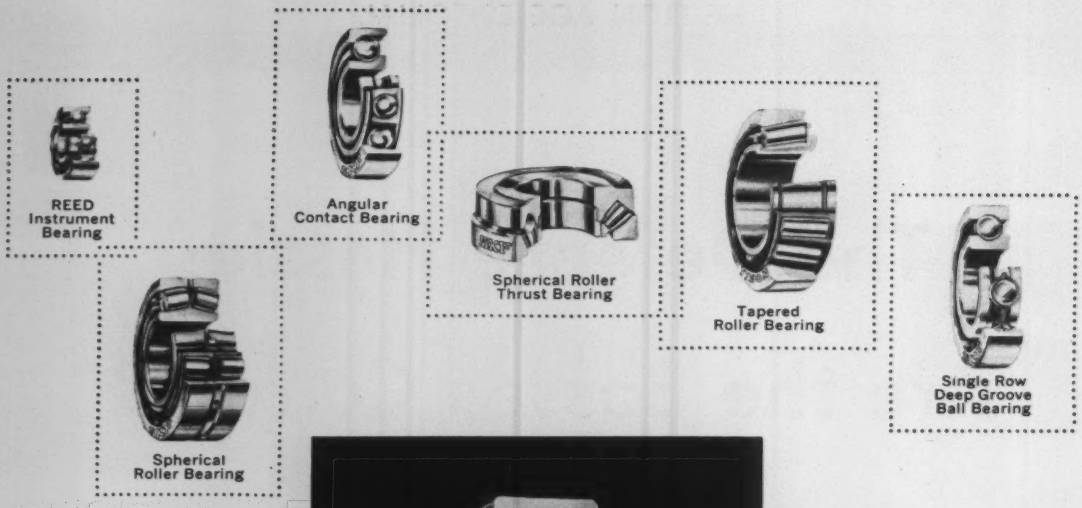
Certainly the President, the Secretary of Defense, the Chairman of the Joint Chiefs of Staff and the Chiefs of Staff ought to know what they are doing defense-wise. As citizens, we should have faith in their judgments.

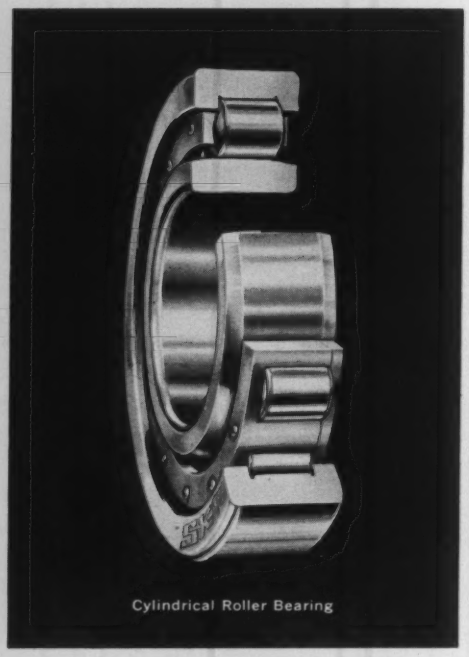
This is not the kind of question which faces a board of directors. It is a question of survival. As such, it isn't going to be settled at a press conference, at a Senate hearing, or by off-hand remarks by the President.

We should back up the President. But we should listen well to others whose viewpoints are at loggerheads with his and his aides. There is no monopoly on brains, military acumen, or the ability to make judgments.

Tom Campbell

Editor-in-Chief



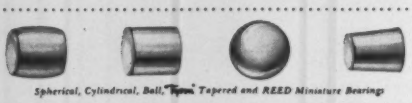


What's a "special size" in production bearings?

SKF makes so many standard sizes, there's practically no such thing as a "special size" of bearing. They range from tiny instrument bearings right up to four-row tapered roller bearings—and account for almost every possible bore size in-between.

Take SKF's standard cylindrical roller bearing, for example. It's promptly available in 154 sizes of single- and double-row types—for shaft diameters ranging from 1" to 9.5". Every size, in both types, offers high radial capacity in relation to its size and operates at highest speeds because of its very low friction.

So, before you specify a "special size" bearing, call the nearest SKF sales office first. The odds are better than 1,000 to 1 that there's already a standard SKF bearing of exactly the size you need. 6007



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Numerical Control to Boom

Civilian use of numerically controlled machines lags behind expectations. But, interest is at a white-hot heat, tool builders report. Machine users want to compare costs of doing jobs on conventional and numerical machines. Builders expect the 1960 machine show—which insiders say will be a maze of N-C machines—to set off the boom in numerical controls for commercial jobs.

Change in Bolting Specs

Users of high-strength bolts are in for some price relief soon. Heretofore, bolting specifications called for one high-strength bolt (about 120,000 psi) to replace each rivet (about 60,000 psi). The new specs will have two bolts replacing three rivets under static loading, and provided that no thread is in the same plane as the connected members.

Prevents Water Stains

Interleaving papers are commonly used by aluminum manufacturers for cushioning flat sheet against vibration and abrasion during shipment. But ordinary interleaving papers don't deter water damage. Corrosion inhibitors, impregnated into the papers, prevent water staining that often forms on the aluminum sheets during humid storage or transit over long periods of time.

Process Cuts Ingot Scrap

A new exothermic material for ingot molds is reported to increase yields for stainless producers. Tests at one mill show an increased yield of 4 pct from ingot to slab and nearly 10 pct from ingot to finished product.

Plastics Offer Challenge

Reinforced plastics are providing good service for several components of the medium range Redstone missile. Two important advantages: heat absorption qualities at extreme temperatures; and up to 40 pct weight reduction. Plastics, for ducts and cooling elements, result in lower costs and easier manufacturing. In vibration tests, a metal bracket failed in four locations: There was no failure in a fiberglass bracket.

Dampen "Skin" Variations

Electro-magnetic induction damping was suggested recently as a means of reducing vibration in the skin of airplanes. High sound levels cause the vibrations. Suppression of these vibrations prevents rapid metal fatigue, says Mr. L. B. Cherry of Lamar State College of Technology. Electro-magnetic induction damping affords an effective method of limiting the vibration amplitude.

Tungsten Plates Surfaces

Tungsten, one of the few metals that has any structural strength above 2000°C, can now be plated on other metal surfaces. A vapor deposition process, developed by the N.B.S., produces relatively pure tungsten coatings. The process can be used to coat simple and complex surfaces or even to fabricate tungsten articles.

Putting Man Into Space

Space officials are chaffing under current criticism of U. S. lag behind Russia. They plan some spectacular space launchings this year. Climax will come with manned rocket flights some 200 miles high. By 1961, the first U. S. manned satellite will be attempted. Space researchers will ask an extra $100 million for the Saturn, a 1.5 million lb thrust rocket, to speed development.

Fast Aluminum Hard-Coat

An improved method of hard-coating aluminum parts is said to be 10 to 50 times faster than conventional methods. The new process also gives greater electrical efficiency, reduced refrigeration needs and light color of end product. The heart of the method, developed by Toro Mfg. Corp., is its ability to utilize very high current densities without burning the aluminum.

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on continuous galvanizing lines
What makes the difference between one galvanizing line and another? How can you save money on the purchase of a Continuous Galvanizing Line? What are the different components that must be considered in the designing of a line?
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Behind Buyers

Sir—We are very much impressed with the concise and useful article in your December 24, 1959 issue entitled "Close Look at Why Buyers Buy."

If possible, we would like to obtain 25 additional copies of this article.—E. Griesbaum, Sales Manager, Tubular Products, Laclede Steel Co., St. Louis, Mo.

▪ **Reprints have been mailed.—Ed.**

Where to Write

Sir—I have just read a very interesting article entiled "Keep Your Eye on Blow Molding" in the January 21, 1960 issue of The IRON AGE.

I would appreciate any information you can give me as to the address of Mr. W. C. Bracken, Hercules Powder Company, so that we may write for additional information regarding this very interesting field.—R. A. Lautier, Chief Engineer, Aerotherm Division, Aerotec Industries, Inc., Bantam, Conn.

▪ **Write to him in care of Hercules Powder Co., 917 Market St., Wilmington 99, Del.—Ed.**

Newsfronts

Sir—On page 9 of your December 24, 1959 issue I find mention of a study on "How to Fabricate Tungsten." No indication is given as to where one might obtain further information on this study. If, as I suspect, the reference is to a report on "Fabrication of Tungsten," by Vincent D. Barth, issued by the Defense Metals Information Center, I can recommend it as a source of information on working of tungsten. Some of your readers might be interested in knowing that this may be obtained by government contractors from the Defense Metals Information Center, Battelle Memorial Institute, Columbus 1, Ohio, or from the Office of Technical Services, PB 151071, Washington, D. C.—L. W. Coffer, Defense Metals Information Center, Battelle Memorial Institute, Columbus, O.

▪ **In order to get as many important items as possible on the page, sources are normally left out. However, all queries are directed immediately to the source.—Ed.**

Reading Matter

Sir—I would greatly appreciate receiving a copy of the 128 page booklet published by The IRON AGE on the 1959 Steel Strike.

For many years I have read and enjoyed the editorials of editor-in-chief Tom Campbell. Many of them should have been compulsory reading for heads of labor unions and our elected representatives in Washington.

I have also found your news of industry, feature articles and news analysis very informative. — R. S. Miller, Miller Engineering Co., Everett, Mass.

▪ **The booklet has been sent. —Ed.**

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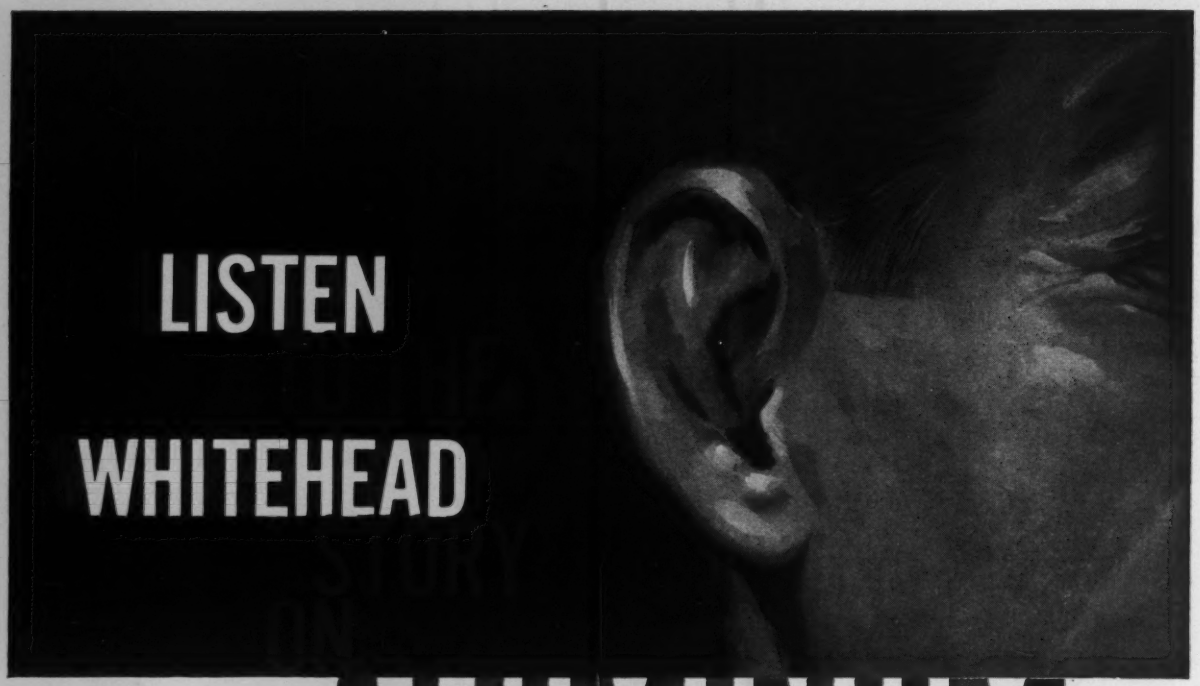

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The Whitehead service story on Aluminum is ur usual. It accommodates the engineer who requires technical help in the planning stage. Then, too, the manufacturer or fabricator who requires the supplementary items—welding rod and fasteners to go with sheet; fittings and valves for the pipeline; etc. Truly a one-stop service from Alcoa's largest distributor in metals and technical help in the East.

Stocks of over 700 sizes of rod, pipe and tube; almost 500 items of sheet; thousands of fasteners and even 18 sizes of a specialty item like tool and jig plate, make Whitehead a true "Supermarket" of aluminum, no matter what your requirements.

Since we stock all the principal corrosion resistant materials—Copper Alloys, Brass, Bronze, Clad Metals, Stainless Steel, Monel, Inconel and Plastics, too—we can and do give unbiased opinions on the right material to do the job. Anytime you need anything in the corrosion resistant line, you'll find it pays to call Whitehead first.

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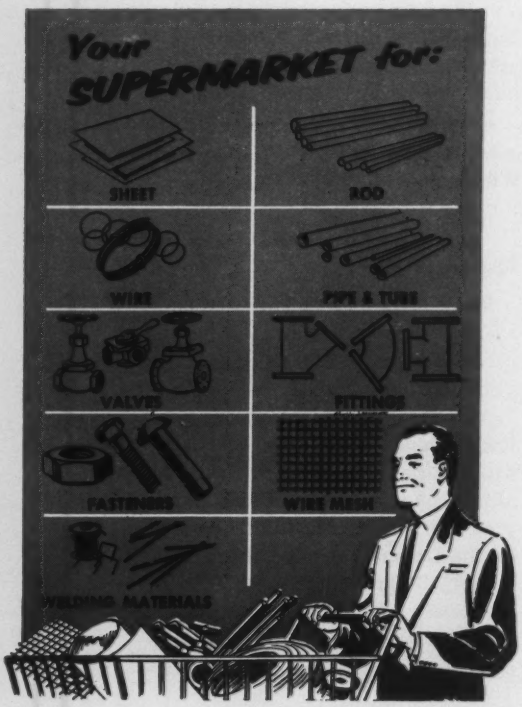


Into the Air

There are few things that can fit into an airplane that haven't been shipped that way. And the list of these grows shorter every day as more shippers are turning to the air for faster delivery.

This week's special report (P. 105) tells the story of how fast shipment of products can be useful to the metalworking industry.

The Unusual — But there are other areas where the speed in shipping by air has been of importance. One of our editors, in getting his material for the report, found a list of the more unusual items carried.

They include human eyes, live bees, radioactive materials, and even seal flippers. The seal flippers were the main ingredients of a Seal Flipper pie baked for a Chicago hospital executive. He says it's a rare delicacy.

Mercy Mission — But only a week ago Air Express was used for a mercy mission. Fresh human milk was flown from Chicago to New York to feed a baby that is allergic to other types of milk.

Portrait of a Lady

The IRON AGE editorial offices were in a bit of a dither one afternoon last week. It seems the editors came across a problem that doesn't come up in the office too frequently.

On page 133 of this issue is the column "Men in Metalworking." And if you'll note the bottom of the page, there is a picture that just doesn't fit the page title.

After some consideration we decided not to change the title to "Men and Women in Metalworking," but would let Miss H. A. Moran, new vice president and assistant secretary, Wean Engineering Co., Inc., join the ranks of others who moved up in their firms.

It's a pleasure, Miss Moran, to have you grace this page. And we're confident the gentlemen won't mind a bit.

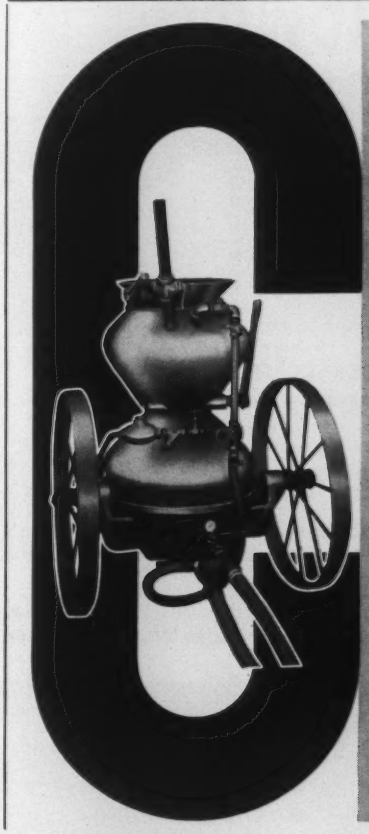
From the Far East

World trade and competition for world markets may be one of the most vital problems confronting industry today. With this in mind, we pass on some comments offered us by Harold Nissley, Cleveland Heights, Ohio, engineer.

Many Questions — Mr. Nissley recently returned from a six-week tour of Japan's industry where he held a series of seminars and did consulting work with some of Japan's leading industrialists. He says every word he spoke was written down. And when he finished giving a talk he was pressed for even more suggestions on improving efficiency.

But Mr. Nissley says he learned some things about the industrial set-up there, too. Unions, he says, are strong in many companies. And the chief contention is the semi-annual bonus. The bonus runs between 20 and 40 pct of the annual base wage. And twice a year the union puts the pressure on management for more bonus—"or else," Mr. Nissley says.

Need and Service — Individual wages are paid on a different basis than they are in the United States. Japanese workers are paid according to need and seniority. A man with five children gets more pay for the same job than does a single man. And a man with 10 years service gets more than the 5-year-man.



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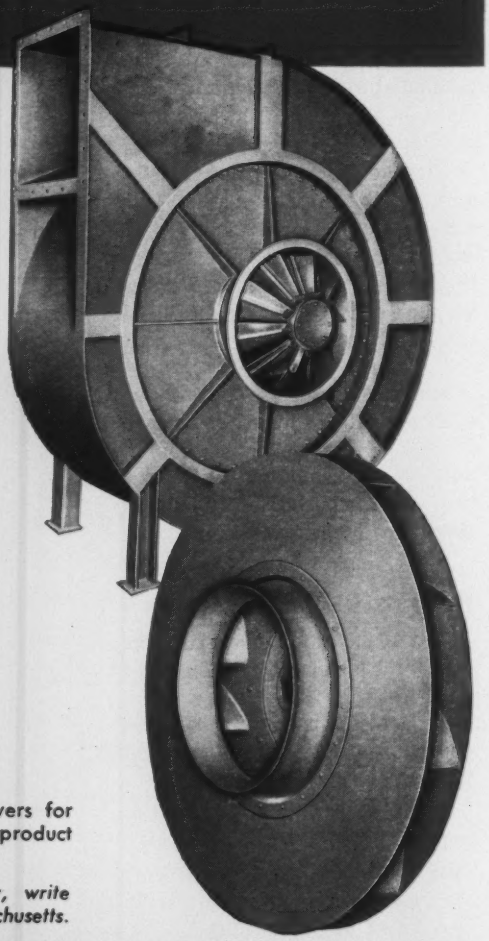

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COMING EXHIBITS

Tool Show—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

Welding Show—April 25-29, Great Western Exhibit Center, Los Angeles. (American Welding Society, Inc., 33 West 39th St., New York 18.)

Southwestern Metal Show — May 9-13, State Fair Park, Automobile Bldg., Dallas, Texas. (American Society for Metals, Metals Park, Novelty, O.)

Design Engineering Show — May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Production Engineering Show—Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Iron & Steel Show—Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

MEETINGS

FEBRUARY

Society for Non-Destructive Testing—Symposium on Aircraft Components, Feb. 16-18, San Antonio, Texas. Society headquarters, 1109 Hinman St., Evanston, Ill.

Malleable Founders Society—Fifth technical and operating conference, Feb. 17-18, Wade Park Manor, Cleveland. Society headquarters,

(Continued on P. 16)

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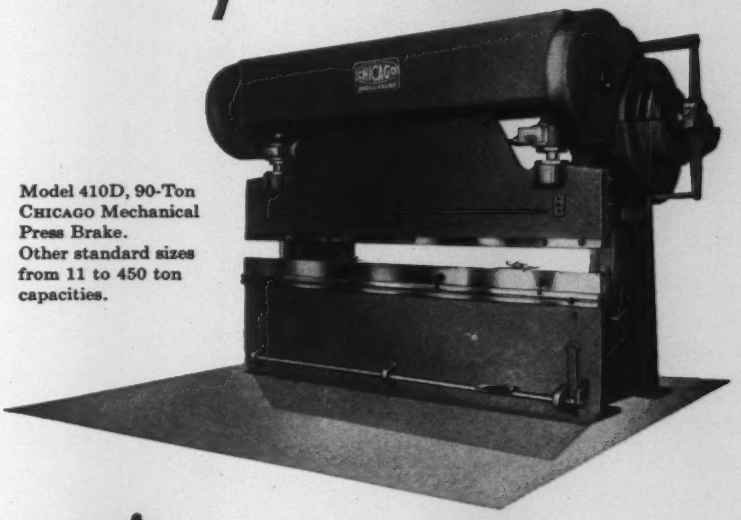
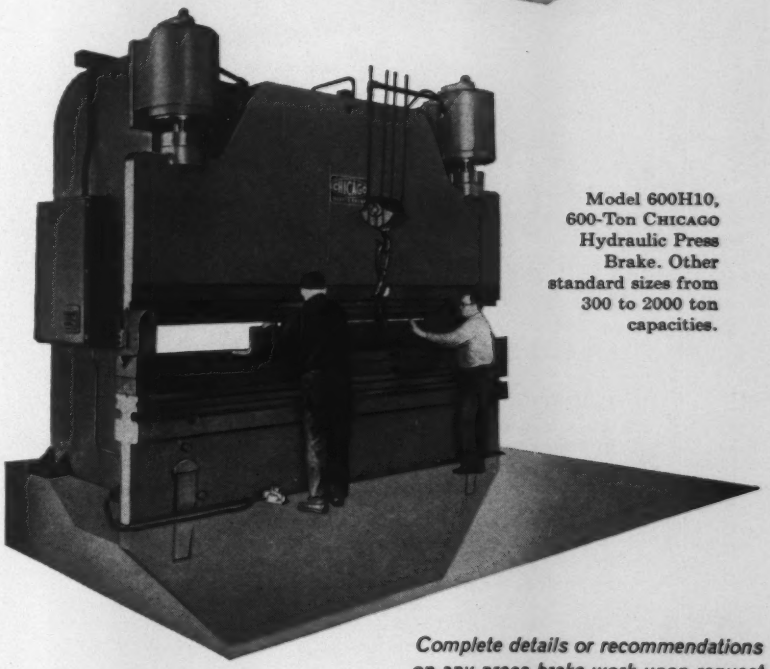


Model 410D, 90-Ton CHICAGO Mechanical Press Brake. Other standard sizes from 11 to 450 ton capacities.



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MEETINGS

(Continued from P. 15)

781 Union Commerce Bldg., Cleveland.

American Institute of Chemical Engineers—National meeting, Feb. 21-24, Biltmore Hotel, Atlanta, Ga. Institute headquarters, 25 W. 45th St., New York.

Industrial Diamond Assn. of America, Inc.—Annual meeting and convention, Feb. 22-25, Hollywood Beach Hotel, Hollywood Beach, Fla. Association headquarters, Box 175 Pompton Plains, N. J.

MARCH

Hoist Manufacturers Assn. — Annual meeting, Mar. 1, Hotel Cleveland, Cleveland. Association headquarters, One Thomas Circle, Washington, D. C.

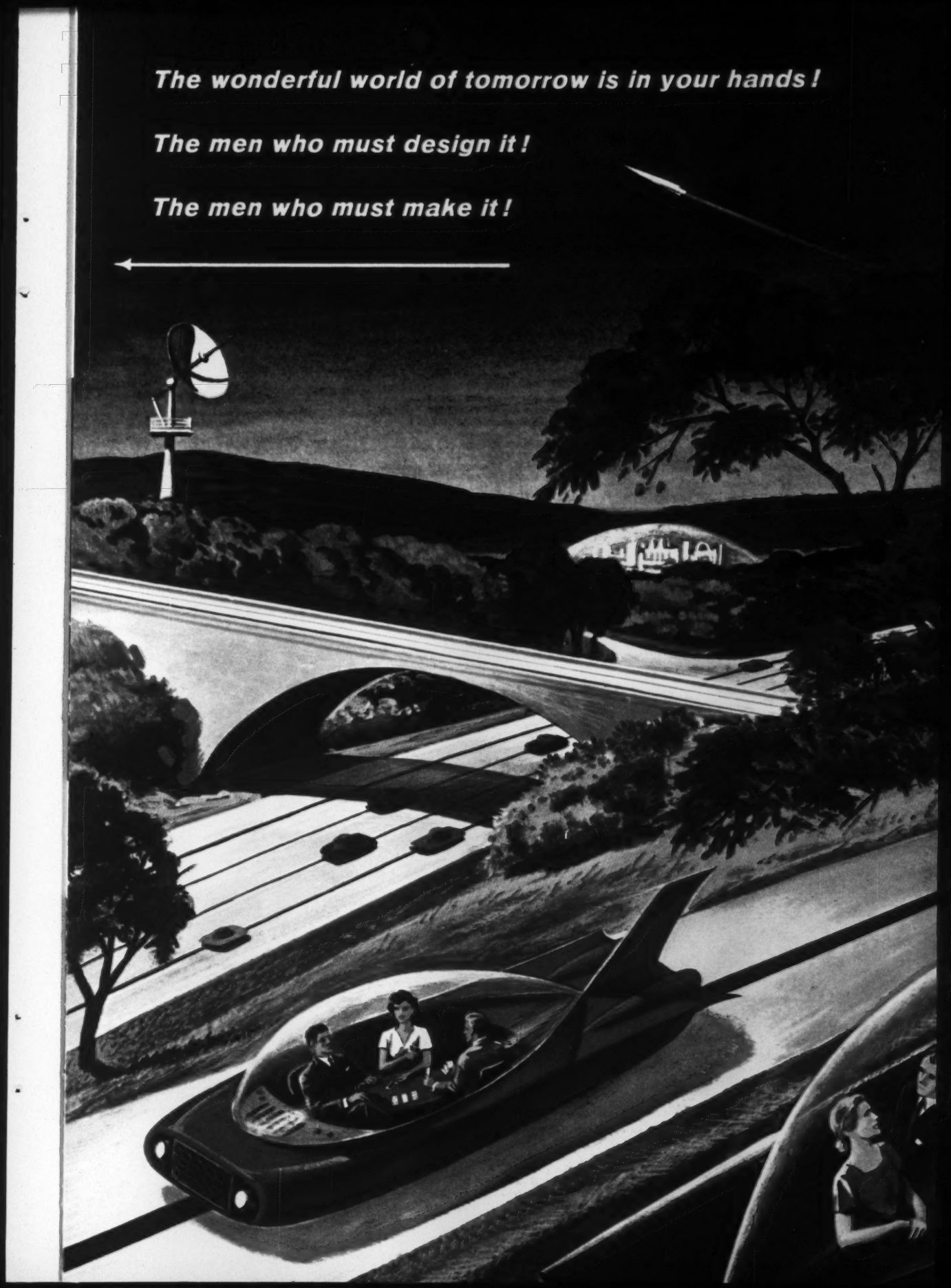
Can Manufacturers Institute, Inc. —Annual meeting, March 7, Waldorf-Astoria Hotel, New York. Institute headquarters, 821—15th St., N. W., Washington 5, D. C.

Assn. of Iron & Steel Engineers—Western meeting, March 7-9, St. Francis Hotel, San Francisco. Association headquarters, 1010 Empire Bldg., Pittsburgh.

Manufacturers Standardization Society of the Valve & Fittings Industry — Annual meeting, March 8-10, The Barbizon-Plaza Hotel, New York. Society headquarters, 420 Lexington Ave., New York.

Aluminum Extruders Council — Quarterly meeting, Mar. 9-11, Arawak Hotel, Jamaica, W. I. Council headquarters, 1015 Chestnut St., Philadelphia.

National Assn. of Waste Material Dealers, Inc.—Annual convention, March 12-15, Waldorf - Astoria Hotel, New York. Association headquarters, 271 Madison Ave., New York 16, N. Y.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Other specialty steels available from your nearby *Carpenter* SERVICE-CENTER: Tool and Die Steels — High Temperature Alloys — Stainless Steels —Tubing and Pipe — Special-Purpose Steels — Fine Wire Specialties.

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Webb Wire Division, New Brunswick, N. J.
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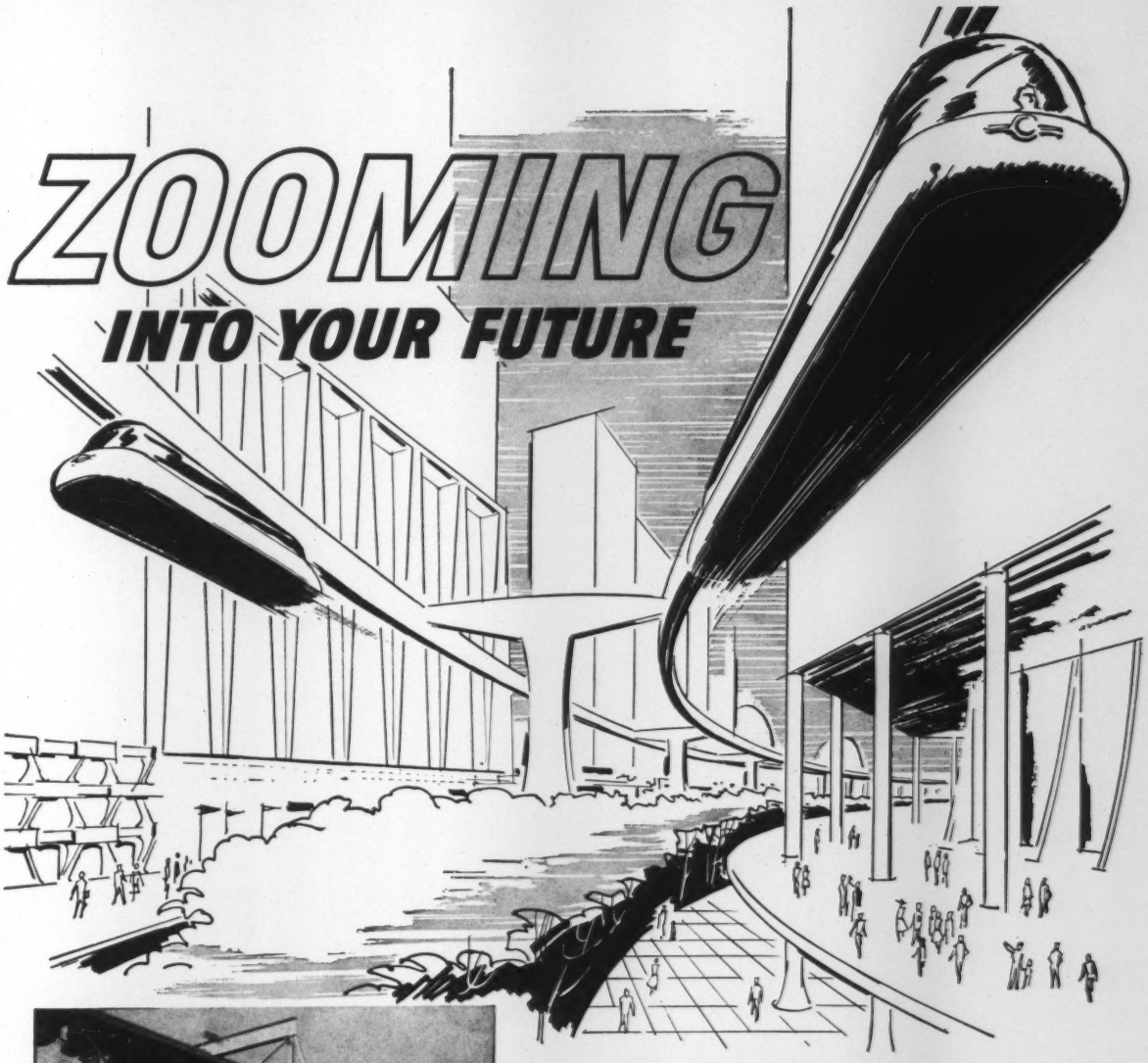

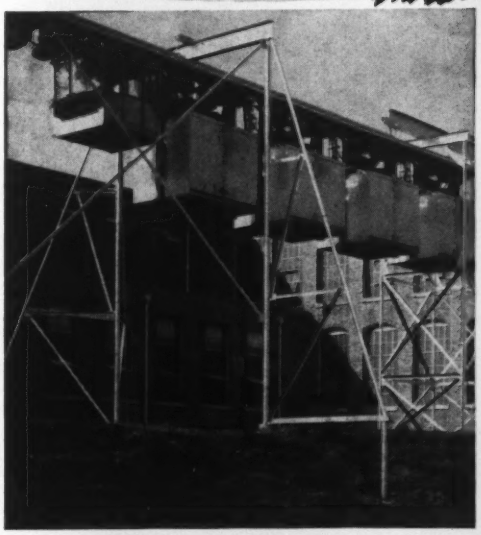

Public transport borrows ideas from American MonoRail

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For over thirty years all kinds of materials have moved on monorail tracks in nearly every industry—and beginning with hand pushed carriers, today's developments include systems that are completely automatic from pick-up to deposit. Heavy—bulky—hard to handle loads travel quickly, safely and directly to their destination—through the air. Only the research and experience of American MonoRail engineers make this equipment possible. Write for Bulletin C-2.

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GULF MAKES THINGS

Fishing reel parts and small precision components for the aircraft industry don't seem to have much in common, except at Scripco Manufacturing Company, Inc., of Laingsbury, Michigan.

Scripco specializes in machining small pieces to exacting specifications. Take spinning reel drive gear stems, for example. When completed they're 1.341″ long. Scripco cuts them from B1113 steel in a single-spindle Brown & Sharpe at 230 sfm. Diameters (eight of them) must be held to tolerances of .0001″. Length must be held to .008″, thickness to .002″ and concentricity to within .002″. Made in 6 operations, pieces take 25 seconds to complete.

"To stay out of trouble on this job, we use Gulfcut 41C," says partner Frank Scripter. "It has just the right amount of sulfur to reduce cutting drag, without corroding the fine threads on this piece."

On another job—machining phosphor bronze pieces—Scripco quadrupled tool life by switching to Gulfcut. Previously they got only 1½ hours of tool life—now with Gulfcut they get a full 6 hours before regrinding.

Frank and James Scripter, brothers and owners of Scripco Manufacturing Company, Inc., Laingsbury, Michigan, show samples of small components to Herman Johnson, Gulf Sales Engineer.

Scripco uses Gulfcut 41C for machining type 416 stainless, B-1112 and B-1113 cold rolled steel. For tough and draggy type 303 stainless, Gulfcut 31C is used.

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NO. 2 OF A SERIES
"How to Design Welded Aluminum Structures"

New Alcoa Yield Strength Concept Reveals Latent Strength of Welded Aluminum

Mr. Harry N. Hill, *Engineering Design Division Chief, Alcoa Research Laboratories, Aluminum Company of America reports research findings presented at the 1959 annual meeting of the American Society of Civil Engineers.*

This is the second in a series of informational articles describing new concepts in the strength and characteristics of welded aluminum. Reports in this series are based on extensive, continuing investigation at Alcoa Research Laboratories, where advanced methods for the use of aluminum structures are being explored.

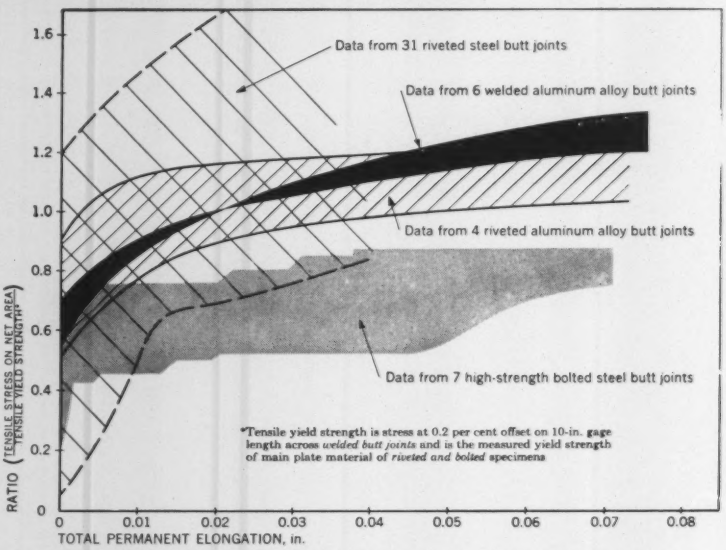
Use of the 10-in. gage length concept recommended here generally produces yield strength values from *30 to 40* per cent *higher* than minimum yield strengths found in and adjacent to welded areas! Adoption of this new design rule will enable designers to take full advantage of the strength of aluminum in welded structures.

In actual practice, it has often been found that the suitability of a structure is not determined by its ultimate strength but by its ability to carry load without significant yielding or permanent deformation. Design of these structures is based on yield strength of the material, modified by an appropriate factor of safety.

Yield strength of aluminum alloys is the axial stress that will produce a permanent change in length of 0.2 per cent in the portion of a standard test specimen having a uniform cross section. In this test, the length for measurement is unimportant, although a 2-in. gage length is commonly used.

If the test specimen contains a butt-welded joint at the middle of the length of uniform cross section, yielding will occur first in the immediate vicinity of the weld, because the heat of welding has softened the metal in this region. The yield strength value of such a piece will, therefore, depend upon the gage length tested.

Experience tells us that it is not reasonable to base a design on the yield strength of the material in and adjacent to the weld since yielding confined to these regions is so localized that the total effect on a welded structure is insignificant. To provide more realistic yield strength values across a welded joint, *it is advocated that such values be determined as the stress corresponding to 0.2 per cent permanent set on a 10-in. gage length.* This permits inclusion of some high-strength material unaffected by the heat of welding. Verification of this technique has been achieved in extensive tests at the Alcoa Research Labs. A future article in this series will provide further supporting data.


Data from 31 riveted steel butt joints
Data from 6 welded aluminum alloy butt joints
Data from 4 riveted aluminum alloy butt joints
Data from 7 high-strength bolted steel butt joints
*Tensile yield strength is stress at 0.2 per cent offset on 10-in. gage length across *welded butt joints* and is the measured yield strength of main plate material of *riveted and bolted* specimens
RATIO (TENSILE STRESS ON NET AREA / TENSILE YIELD STRENGTH*)
TOTAL PERMANENT ELONGATION, in.
0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08

Permanent Elongation of Welded, Riveted and Bolted Joints

A basic premise of this new concept was that a welded aluminum joint should function much as a riveted or bolted joint. The chart demonstrates that the nature of the yielding of *welded aluminum* alloy butt joints based on the 10-in. gage length yield strength is *about the same* as that in *riveted or bolted joints* of aluminum alloy or steel.

The first article in this series of new design concepts for welded aluminum structures dealt with the "reduced-strength zone." Subsequent subjects will feature strength of welded members in tension, strength of welded members in compression, strength of welded beams, fillet welds and design data.

For top quality aluminum welding products such as consumable electrodes, welding and brazing rods and fluxes; and solder and soldering fluxes; contact your nearest Alcoa sales office. For more complete information on "Designing Welded Aluminum Structures," write Aluminum Company of America, 1761-B. Alcoa Building, Pittsburgh 19, Pa.

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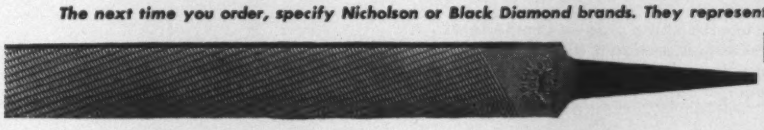

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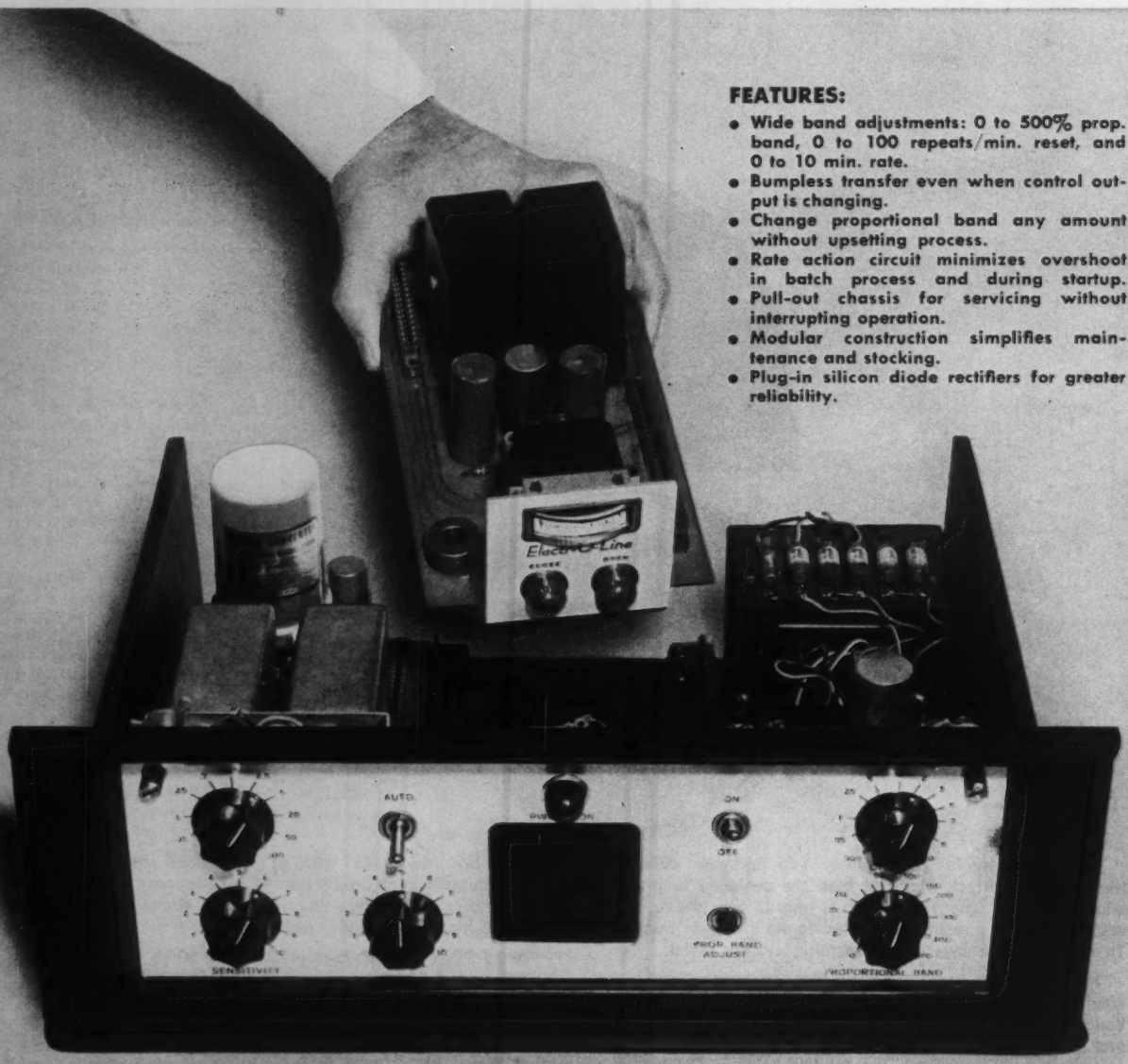

FEATURES:

- Wide band adjustments: 0 to 500% prop. band, 0 to 100 repeats/min. reset, and 0 to 10 min. rate.
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- Rate action circuit minimizes overshoot in batch process and during startup.
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All three units use the same plug-in components . . . only the control output section is different. Simplifies on-the-job servicing . . . eliminates need for complicated test equipment.

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***Electr-O-Volt* Control Unit**—For electronic current output proportioning control with reset and rate action

One of these units—*Electr-O-Line*, *Electr-O-Pulse* or *Electr-O-Volt*—will deliver the exact kind of temperature control that's best for your furnace.

Plug-in construction is used throughout all three units—including common amplifier and power supply sections. Operator adjustments are exactly alike for all three units. Interchangeability of control output sections simplifies stocking and service problems.

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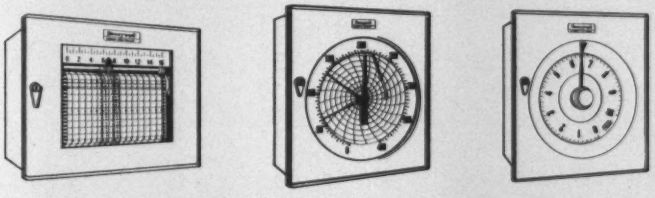

Use *ElectroniK* strip chart, circular chart or circular scale controllers to actuate *Electr-O-Line*, *Electr-O-Pulse* or *Electr-O-Volt* units. They are integrally mounted, simplifying panel cutout and reducing wiring costs.

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Eastern's precision rolling holds the gauge toward the light side of recognized tolerances . . . actually delivers more area of stainless per ton. Result: Since you sell by the square foot, you earn more dollars per sale.

There's profit in precision rolled stainless from Eastern.

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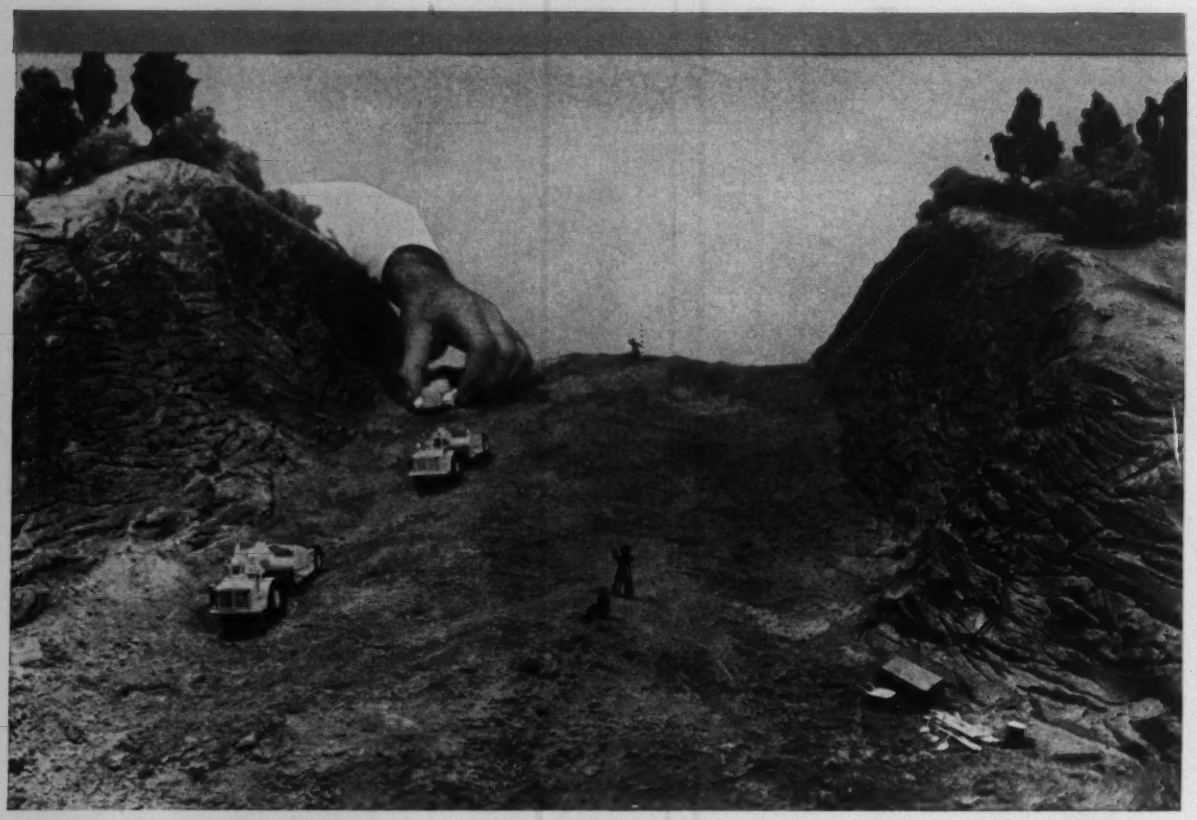
stainless steel sheets, plates, strip, coils



Custom made for rugged service

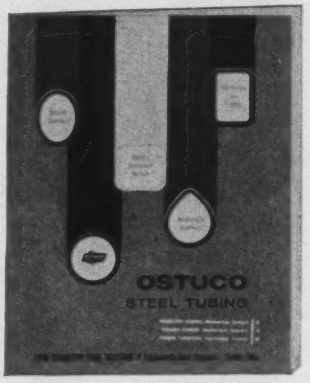
Big-job earth moving is a slamming, bruising, round-the-clock business that plays hob with construction machinery. Only the best custom-designed equipment can take the brutal punishment.

And only the finest, toughest seamless tubing can come up smiling in this rugged service. Custom quality Ostuco Tubing stands the gaff . . . fills the bill order after order.

If you're now compromising with stock tubing, consider all the advantages of custom quality Ostuco Tubing. Consistently you receive the exact tubing you want—the size, length, grade—with the strength and tolerances you need. For machined parts, you get our recommended rough size guaranteed to clean up.

With all these advantages, custom quality Ostuco Tubing is obtainable in small minimum quantities—as little as a few hundred feet. Contact your nearest Ohio Seamless representative, or the plant at Shelby, Ohio—Birthplace of the Seamless Steel Tube Industry in America. A-1282A

Scale model illustrated built to 3.5 mm scale.



Complimentary Copy of new Bulletin CS60 "Ostuco Steel Tubing" sent on request.

OSTUCO SHELBY, OHIO

OHIO SEAMLESS TUBE

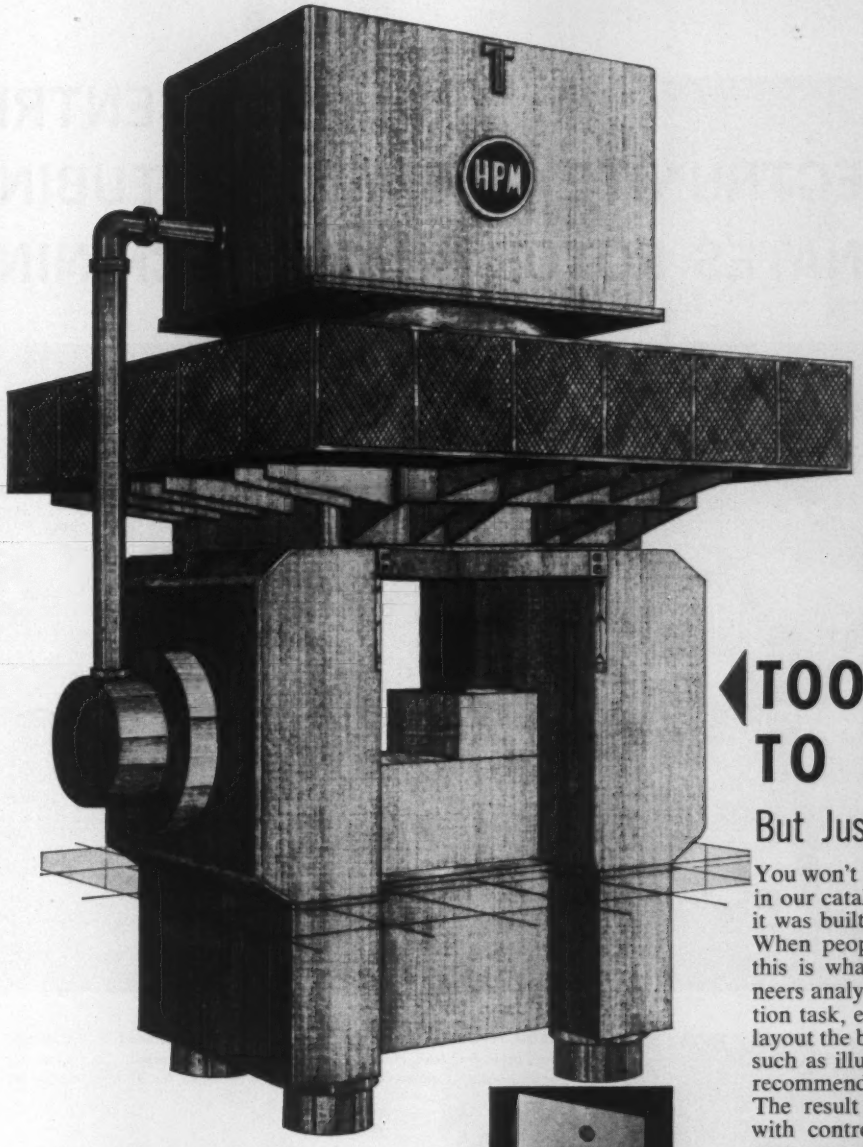
Division of Copperweld Steel Company • SHELBY, OHIO

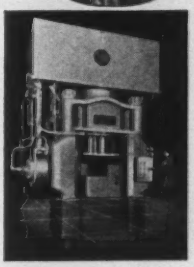
Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Los Angeles (Lynwood), Miami, Moline, New Orleans (Chalmette), New York, North Kansas City, Philadelphia (Wynnewood), Pittsburgh, Rochester, St. Louis, St. Paul, Salt Lake City, Seattle, Tulsa, Wichita

CANADA: Railway & Power Engr. Corp., Ltd. EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York

HOW MODIFIED H-P-M STANDARDS TRIPLE
THE USEFULNESS OF METALWORKING PRESSES





From original design sketch to finished press, at right, H-P-M engineers apply the experience gained from literally hundreds of other "modified" standards. This press was expressly designed for high speed production of bar shapes, in refractory metals, carbides, etc. Force is infinitely variable up to 3000-tons downward with 1500-tons side action. A smaller internal ram provides separate action with over twice the speed for work less than 1200-tons.

TOO CUSTOM TO CATALOG

But Just Right For The Job

You won't find this 3000-ton H-P-M press in our catalog, but it fits the job for which it was built . . . *like a glove*. It's a typical. When people bring problems to H-P-M, this is what happens: Experienced engineers analyze every phase of your production task, establish the physical needs and layout the basic requirements in a machine such as illustrated. Standard elements are recommended in the majority of cases. The result — a standard press, modified with control and power essentials to fit your range of products exactly. *Special*, as required to handle your production problem with greatest efficiency; *standard*, to the extent that minimum engineering is required due to the hundreds of presses designed in the past for special requirements.

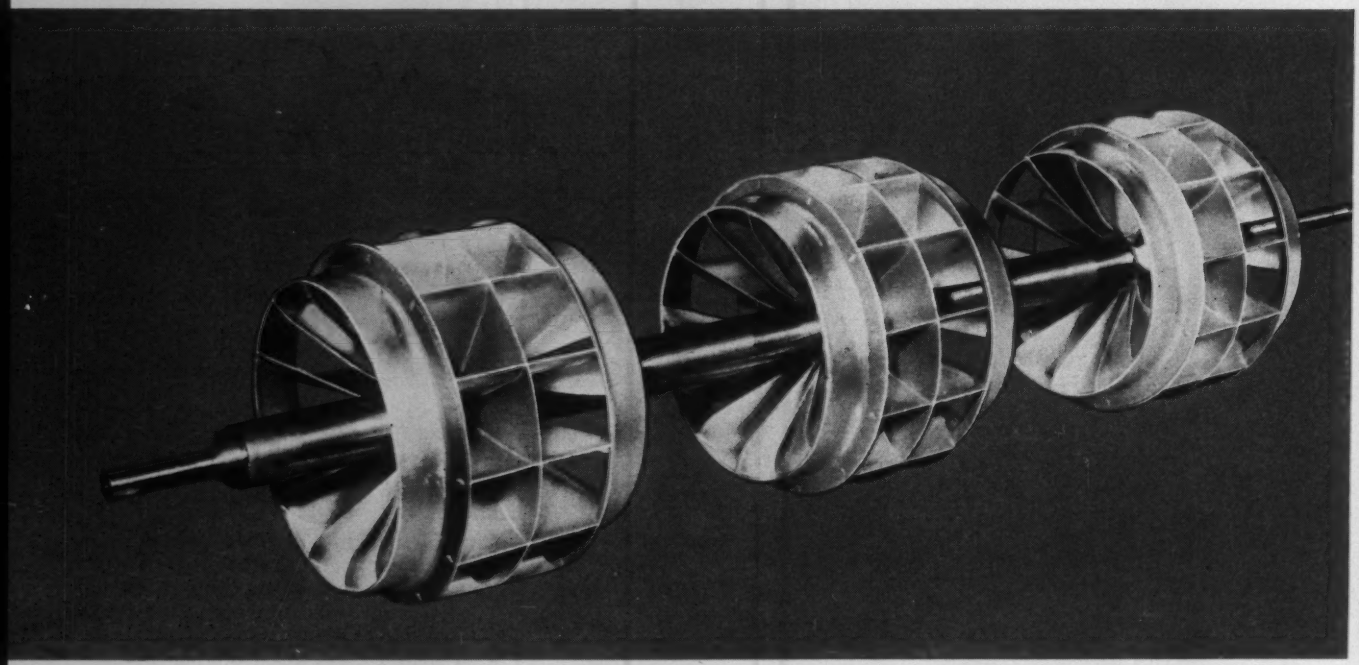
You're under no obligation if you ask the "why and how" of this specialized service. Write or call for complete details. See how better quality production can be planned more efficiently, at lower costs.

THE HYDRAULIC PRESS MANUFACTURING COMPANY
A Division of Koehring Company • Mount Gilead, Ohio, U.S.A.

HPM

H70

TRULY CONCENTRIC ELECTRUNITE MECHANICAL TUBING ELIMINATES ROTOR SHAFT MACHINING



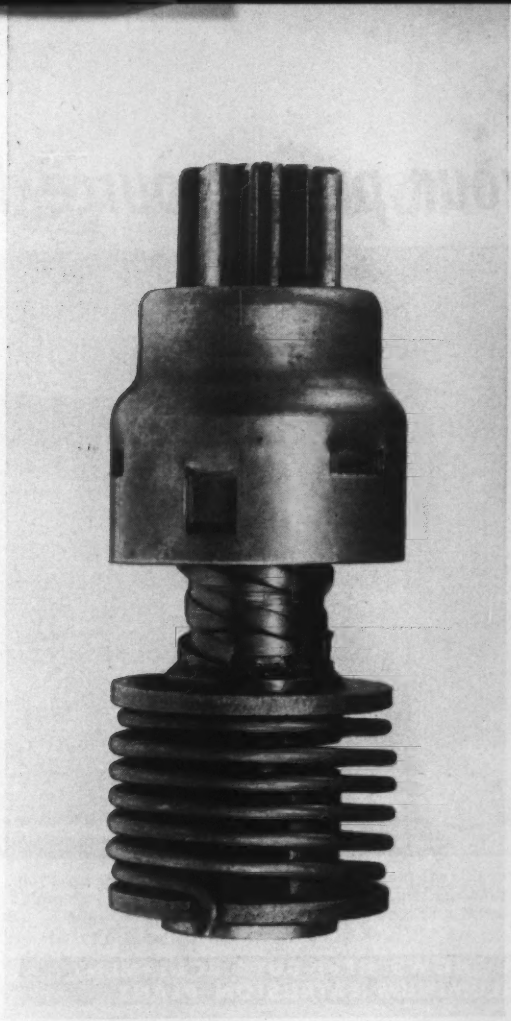
SCROLL-TYPE BLOWERS up to 27″ in diameter are mounted on ELECTRUNITE shafts, some up to 94″ long, and designed to operate at approximately 1,110 rpm. Careful balance and uniformity of the tubing is required for high operating efficiency.

DUE TO THE UNIFORM CONCENTRICITY of Republic ELECTRUNITE Mechanical Tubing, no machining is required in producing air conditioning rotor shafts at Buffalo Forge Company. Rotor shafts are bored at each end and plug inserted for the bearing. Because of the uniformity of ELECTRUNITE, only .015 of the stock is removed before the plug is pressed into the tubing ends.

Buffalo Forge Company, Buffalo, New York, saves valuable machining time by using Republic ELECTRUNITE® Mechanical Tubing in manufacturing air conditioning and ventilating units. ELECTRUNITE in sizes of 3″ to 3¼″ O.D., 8-gage, is used as shafting for the rotors of the blower system.

Scroll-type blowers up to 27″ in diameter are mounted on ELECTRUNITE shafts, some up to 94″ long, and designed to operate at approximately 1,110 rpm. Small shafting will turn at 2,300 rpm. True concentricity of ELECTRUNITE is vital to high operating efficiency of these units due to the careful balance required in relation to the high rpm and weight involved.

Republic ELECTRUNITE Tubing, carbon or stainless, may solve your particular production or cost problems, too. Call your Republic representative, or write direct.



2.

3.

1.

1. FIVE REPUBLIC METAL POWDERS give you broad spectrum coverage. Republic's wide range of iron and alloy powders cover all known physical property requirements of metal part fabricators. Send for booklet, ADV. 1014 for complete technical information on Types G, N, S, and Type MS. Information on Type HS6460 is contained in booklet, ADV. 1028. Write today.

2. REPUBLIC COLD DRAWN ALLOY STEEL is used by a leading manufacturer for one of the most critical components in their automobile starter drive assemblies—the drive pinion. Use of Republic Cold Drawn Alloy provides the necessary strength and toughness to withstand severe torque, impact, and prolonged wear. Write for additional information.

3. REPUBLIC NYLOK® FASTENERS provide secure holding power where it's needed most in the Twin Power Riding Mowers produced by Roberton Manufacturing Company, Chicago. A special nylon insert assures positive locking, maximum holding power—even under severe vibration. The insert in NYLON fasteners is unaffected by age or cold, has high resistance to heat. Send coupon for additional data.

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REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. IA-8736
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send additional information on the following products:

- ☐ Republic ELECTRUNITE Tubing ☐ Carbon ☐ Stainless
- ☐ Republic NYLOK Fasteners
- ☐ Alloy Steels
- ☐ ADV. Booklet 1014
- ☐ ADV. Booklet 1028

Name_____ Title_____

Company_____

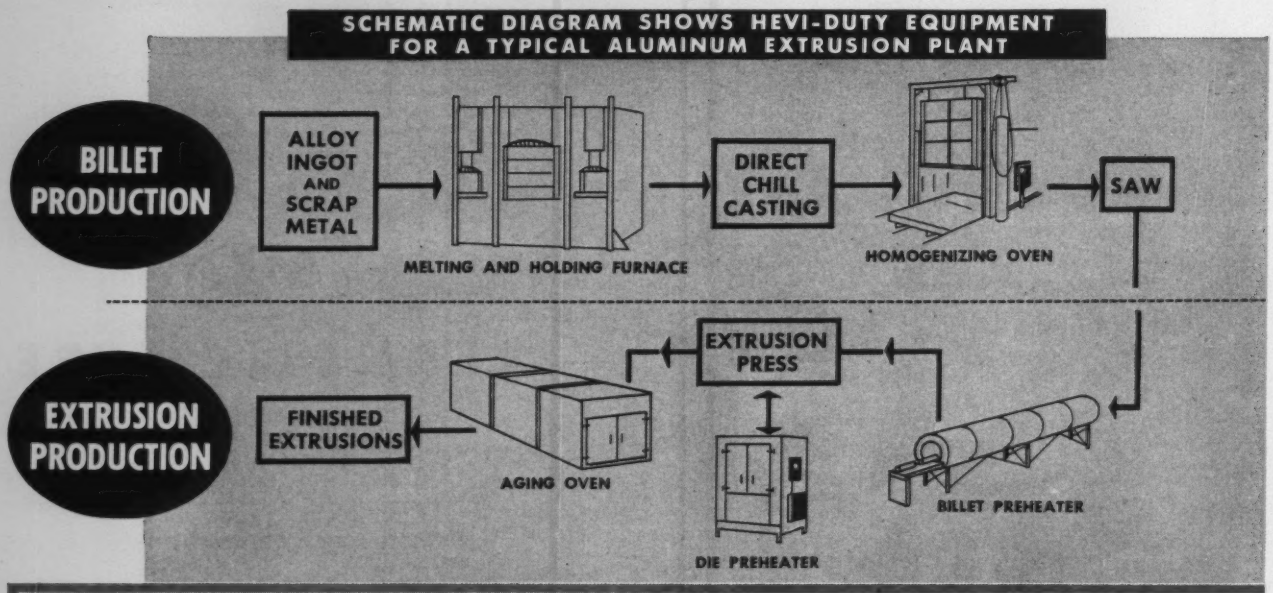
Address_____

City_____ Zone____ State_____

HEVI-DUTY your prime source for

MELTING AND HOLDING FURNACE—*These Hevi-Duty reverberatory furnaces provide maximum efficiencies for melting and holding aluminum. Available in capacities to 60,000 pounds, this type of furnace can be used for smelting, billet casting, die casting, permanent mold work, and other foundry melting.*

SCHEMATIC DIAGRAM SHOWS HEVI-DUTY EQUIPMENT FOR A TYPICAL ALUMINUM EXTRUSION PLANT



FROM INGOTS TO FINISHED PRODUCTS . . . HEVI-DUTY PROVIDES

quality furnaces and ovens for aluminum

Melting, holding, and heat-treating furnaces . . . billet preheaters, homogenizing and aging ovens . . . engineered to meet your production requirements.

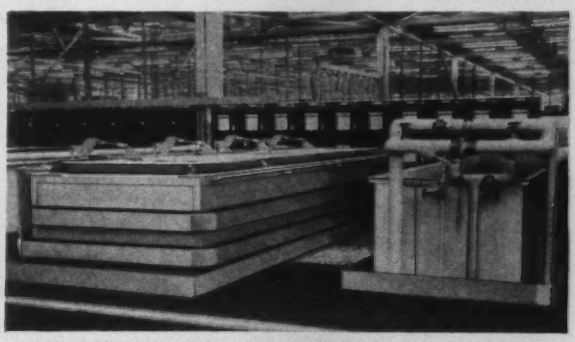
Whatever your heating requirements for processing aluminum, you can depend on Hevi-Duty standard and specially-engineered furnaces and ovens to do the job efficiently and economically. Throughout the aluminum industry, Hevi-Duty equipment serves in practically every phase of heat-treatment and melting.

For example: In a typical aluminum extrusion plant, as illustrated in the schematic diagram, Hevi-Duty equipment plays a major role. Fuel-fired reverberatory furnaces provide fast, controlled heat for melting and holding metal for billet casting. Hevi-Duty homogenizing ovens, either fuel-fired or electrically heated, assure high quality aluminum billets. Hevi-Duty preheat ovens are used to heat the billets in preparation for extruding. Hevi-Duty tray type ovens are used to preheat extrusion dies. Aging of the extruded aluminum shapes is accomplished in Hevi-Duty ovens at temperatures to 400° F.

What's more, Hevi-Duty offers a complete range of electric and fuel-fired heat-treating furnaces for rapid solution treatment and aging of aluminum and aluminum alloys at elevated temperatures.

The application of heat to aluminum is a specialty at Hevi-Duty. Our engineers can help you boost your product output at lower cost. Contact Hevi-Duty first for *all* furnaces and ovens required for processing aluminum.

HOMOGENIZING OVEN—*Homogenizing of aluminum logs is accomplished in this Hevi-Duty car-bottom oven at temperatures of approximately 1000° F. Finished extrusions consequently have superior physical properties.*



SOLUTION TREATMENT AND AGING—*Typical Hevi-Duty immersed electrode salt bath furnace used for solution heat-treating of large aluminum aircraft sections. Furnace illustrated has a pot 20 feet long, 4½ feet wide, and 6 feet deep.*

ASK HEVI-DUTY

For more information on the complete range of furnaces and ovens for aluminum processing, write for bulletins 653, 591, and 159.

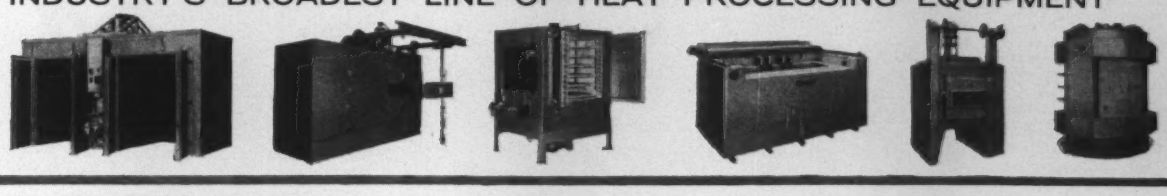
HEVI-DUTY

A DIVISION OF BPC BASIC PRODUCTS CORPORATION

HEVI-DUTY ELECTRIC COMPANY, MILWAUKEE 1, WISCONSIN

Industrial Furnaces and Ovens, Electric and Fuel • Laboratory Furnaces • Dry Type Transformers • Constant Current Regulators

INDUSTRY'S BROADEST LINE OF HEAT PROCESSING EQUIPMENT



the most DYNAMIC ATTRACTION a show ever had!

at the 1960 PHILADELPHIA

42nd NATIONAL METAL CONGRESS & EXPOSITION

Philadelphia Trade and Convention Center • Oct. 17-21, 1960

EXHIBITORS FROM ELEVEN METALS AREAS

1. Ferrous Metal Producers and Distributors
2. Nonferrous Metal Producers and Distributors
3. Related Engineering Materials
4. Nuclear Materials and Equipment
5. Tool Materials, Cutting-Off and Forming Equipment
6. Industrial Heating Equipment and Supplies
7. Cleaning and Finishing Equipment and Supplies
8. Welding and Joining Equipment and Supplies
9. Testing, Inspection and Control Equipment and Supplies
10. Production and Casting Equipment and Supplies
11. Parts, Forms and Shapes for Design and Applications

Exhibitors at the Philadelphia Metal Show will gather their customers and prospects from the broad metalworking industry, including automotive, aircraft, appliance, ordnance, farm machinery, electrical machinery, instruments, and miscellaneous metalworking manufacturers . . . creating a thriving, effective, profitable marketplace. If your potential for sales lies in any of these areas, the Metal Show should take priority in your sales plan for maximum impact in the Soaring Sixties.

Floor Plan Folders are now available — for complete information, consult the ASM representative nearest to you, or write direct.

NEW YORK — OXford 7-2667
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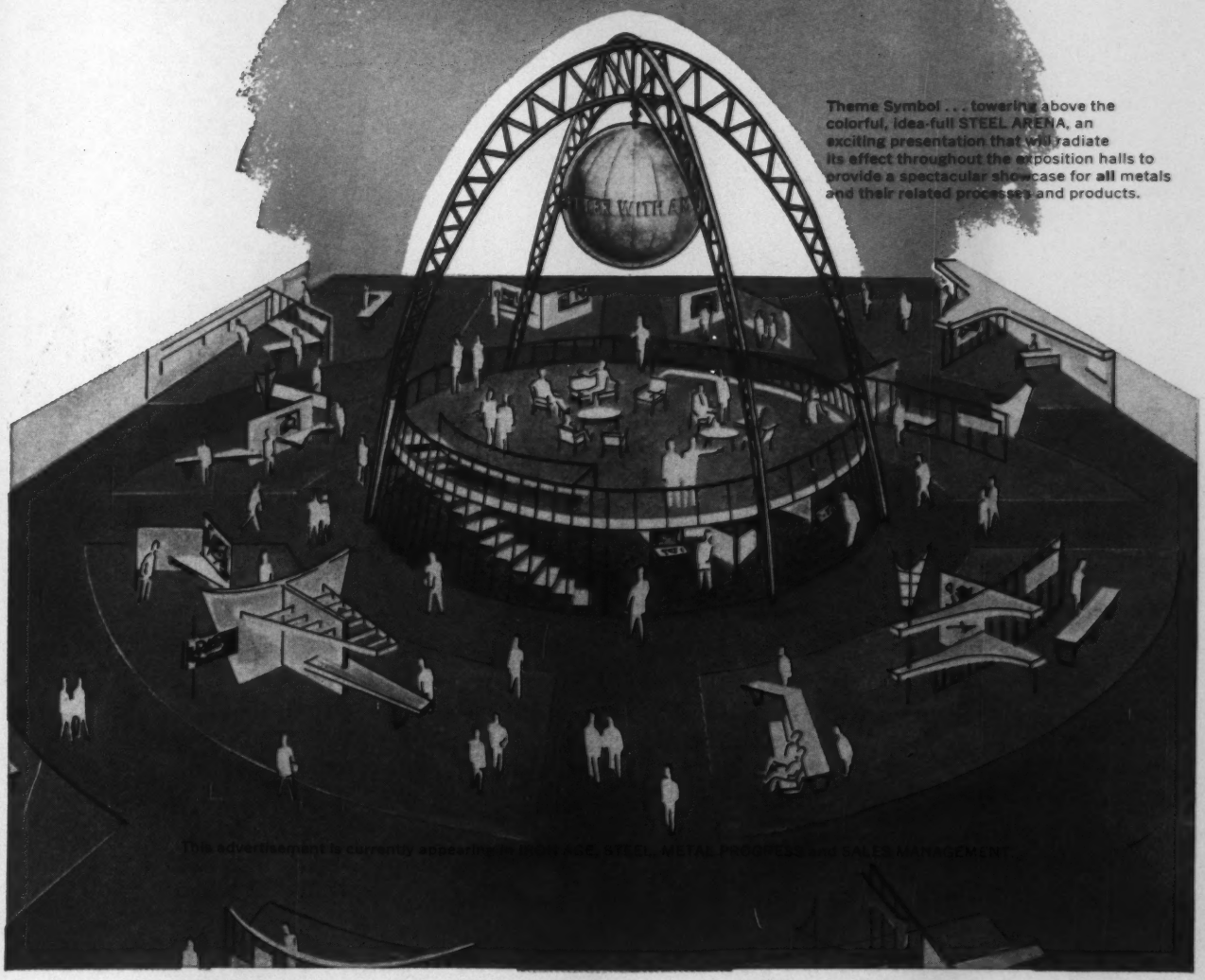
Steel, the sinew that binds the strength of America, will serve as a magnetic attraction to call attention to **every** area of metals technology, ferrous and nonferrous, at the most metallic of all Metal Shows — the 1960 Philadelphia Metal Show, now blue-printed and ready to grow into its full dimensions. This new emphasis on the essential metals of industry reflects a growing specialization . . . a **focusing** of attention . . . to yield a greater benefit. In the evolution of the Metal Show, the time for such refinement has come. Now it is possible to achieve a concentration on **materials** that is unsurpassed anywhere for an intensive person-to-person interchange of information. The STEEL ARENA is the threshold to a whole new world of metals within the exhibits and technical sessions. The pre-eminence of a Metal Show of these dimensions is worth your closest consideration as an exhibitor — you are invited to share its benefit in any of the eleven areas of metals listed.

MAKE PLANS NOW TO EXHIBIT AT THIS GREATEST OF ALL METAL SHOWS!

AMERICAN SOCIETY FOR METALS
Metals Park • Novelty, Ohio

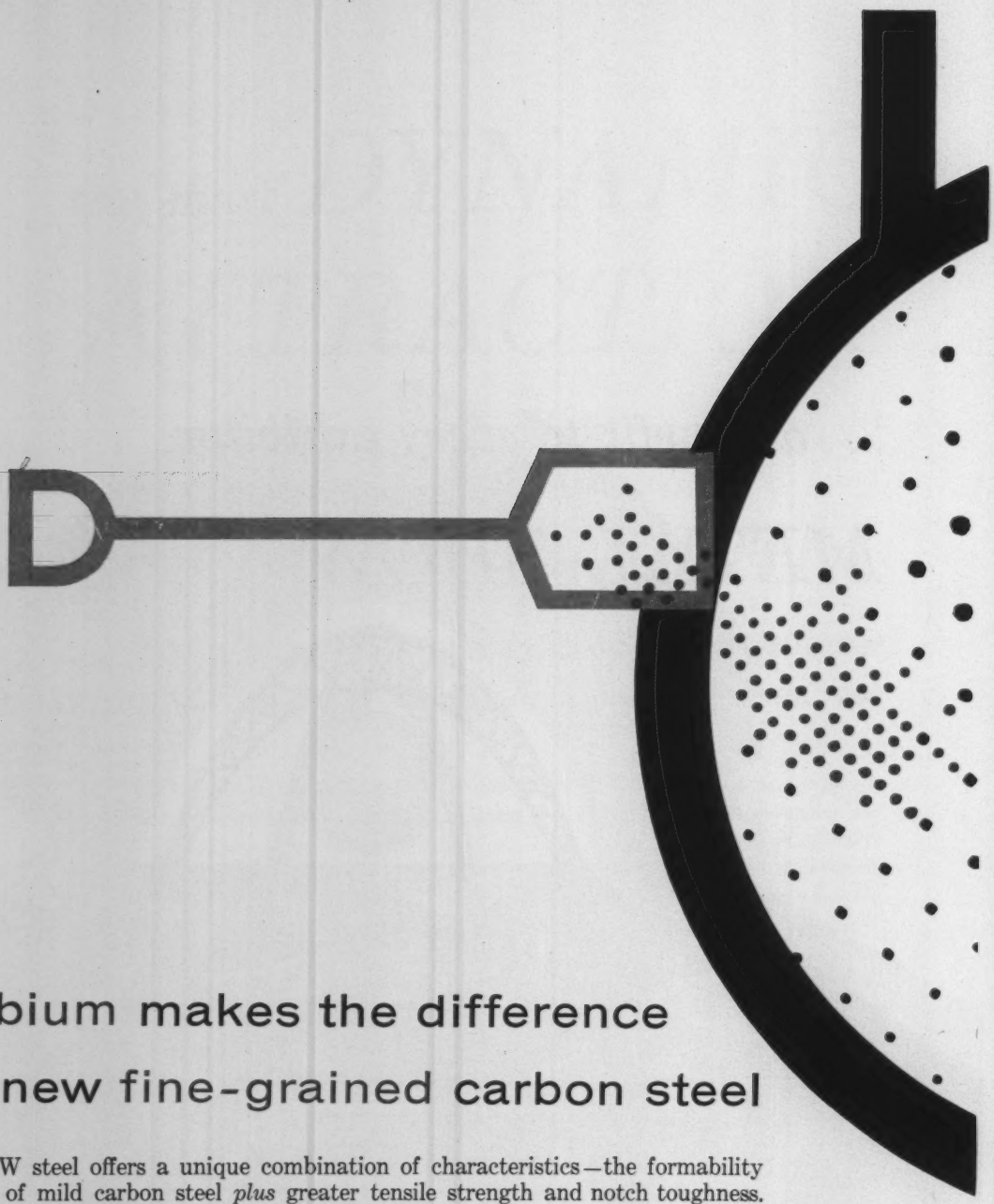
. . . a benefit to every exhibitor

METAL SHOW



Theme Symbol . . . towering above the colorful, idea-full STEEL ARENA, an exciting presentation that will radiate its effect throughout the exposition halls to provide a spectacular showcase for **all** metals and their related processes and products.

This advertisement is currently appearing in IRON AGE, STEEL, METAL PROGRESS and SALES MANAGEMENT.



Columbium makes the difference in this new fine-grained carbon steel

The new GLX-W steel offers a unique combination of characteristics—the formability and weldability of mild carbon steel *plus* greater tensile strength and notch toughness.

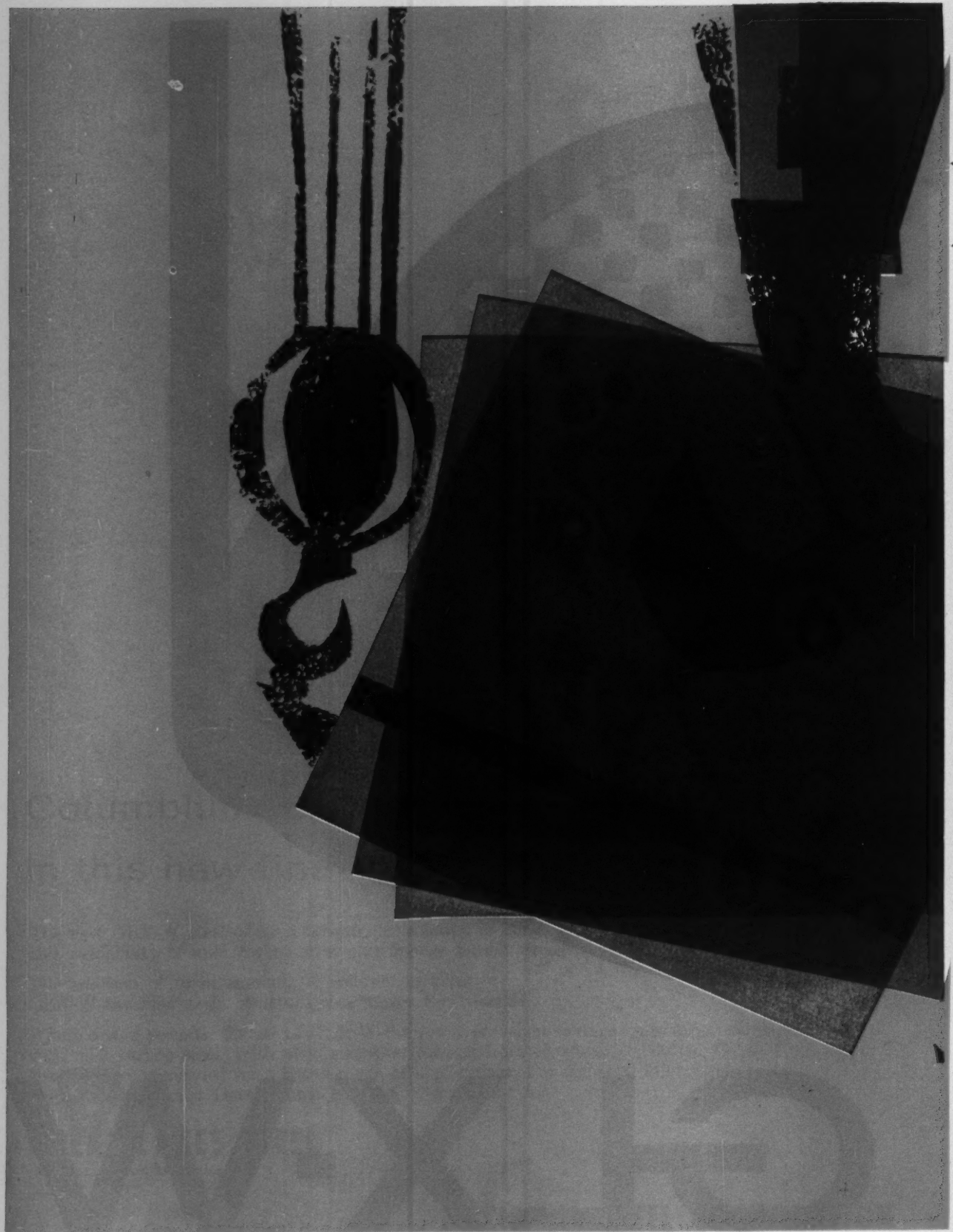
The addition of small amounts of columbium gives GLX-W the finer grain structure that makes this possible.

Where design permits, the use of GLX-W can result in weight savings up to 35%, compared with mild carbon steel. With yield strengths ranging from 45,000 to 60,000 psi, GLX-W steels are recommended for a broad range of applications. For technical information, write to our Product Development Division, Department A.

GREAT LAKES STEEL
Detroit 29, Michigan

Great Lakes Steel is a Division of **NATIONAL STEEL CORPORATION**

GLX-W



NEW STEEL PRODUCTION RECORDS WITH KAISER BASIC REFRACTORIES!

KEY TO SIDEWALLS: ". . . Periclase Chrome metal cased keys in upper sidewalls of electric furnace gave best performance we've had—15 per cent better than any brick used in the past."

BREAKS PRODUCTION RECORD: "... last furnace rammed with Permanente 165 broke its old production record by more than enough to pay for the bottom."

GUNNING FOR PROFIT: ". . . consumption of K/R 165 Gunning Grains is down to 4.5 pounds per ton compared to 6 pounds for competitive mix—makes it a paying proposition."

EACH of these statements from Kaiser Refractories customers reports a new performance record or production record made possible by changing to a Kaiser Refractories Product.

WHY THIS UNIFORM SUPERIORITY? Kaiser Refractories are especially designed for peak performance in specific applications in open hearth and electric steel furnaces. Each is a specially-developed composition, and all are backed by more than 17 years of continuous research and development.

The uniform composition of Kaiser Refractories—your guarantee of dependability—is assured by Kaiser Refractories' fully-integrated facilities. Quality is rigidly controlled from raw material production to assistance in final installation at your mill.

Ask to see the 30-minute color movie, "Progress in Modern Basic Refractories." Arrangements will be made by your Kaiser Refractories Sales Representative.

KAISER REFRACTORIES*

Mexico Refractories Company now merged with Kaiser Refractories

Call or write Kaiser Refractories & Chemicals Division, Dept. SO113, Kaiser Aluminum & Chemical Sales, Inc., at any of the Division Offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
MEXICO, MISSOURI . . . . . Mex-R-Co Building
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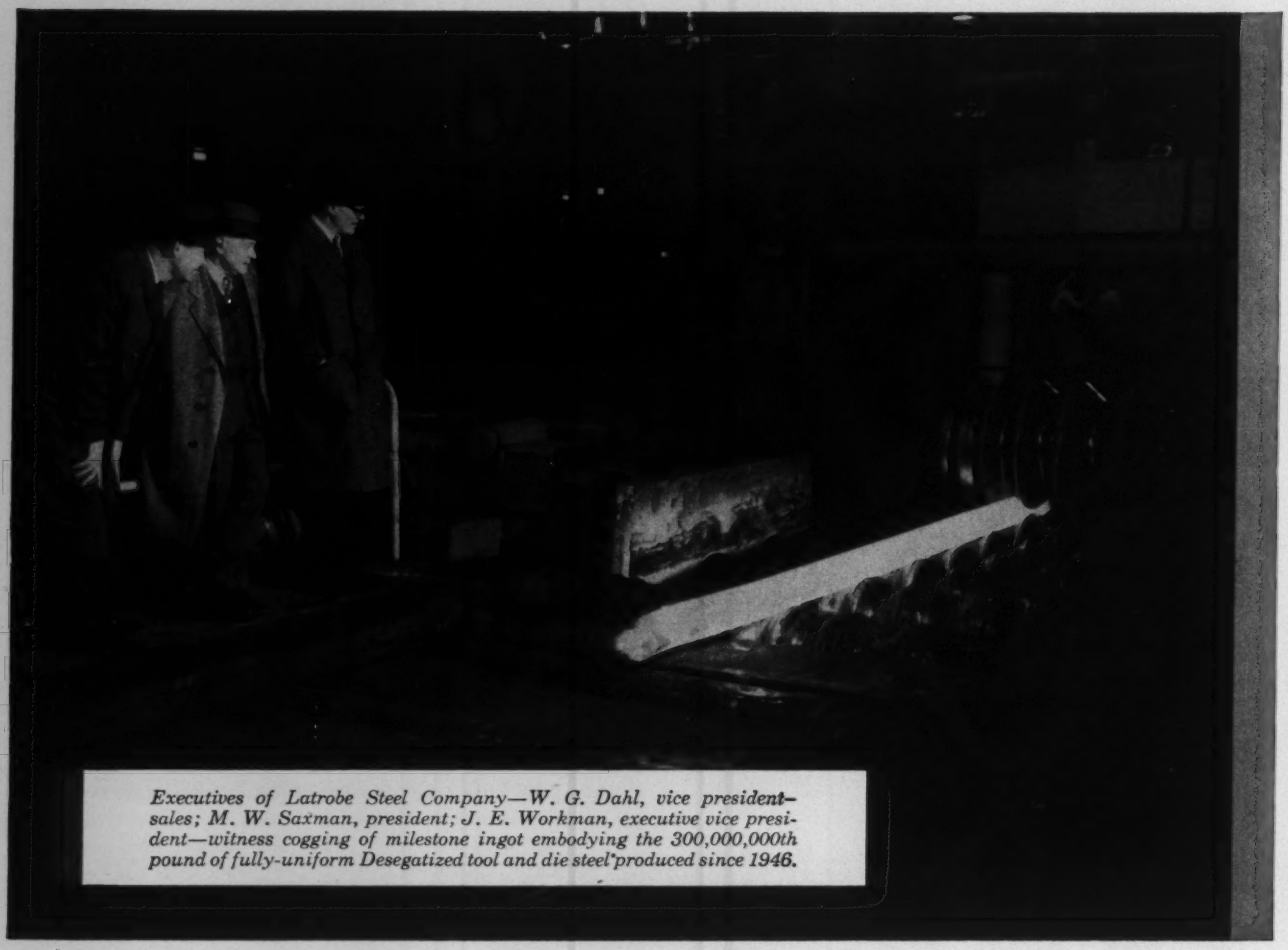
MEX-R-CO High Alumina, Fireclay and Silica Refractories

Kaiser Periclase Brick, Mortars, Grains and Ramming Mixes

*TRADEMARK KAISER ALUMINUM & CHEMICAL CORP.



Executives of Latrobe Steel Company—W. G. Dahl, vice president–sales; M. W. Saxman, president; J. E. Workman, executive vice president—witness cogging of milestone ingot embodying the 300,000,000th pound of fully-uniform Desegatized tool and die steel produced since 1946.

300,000,000 lbs.

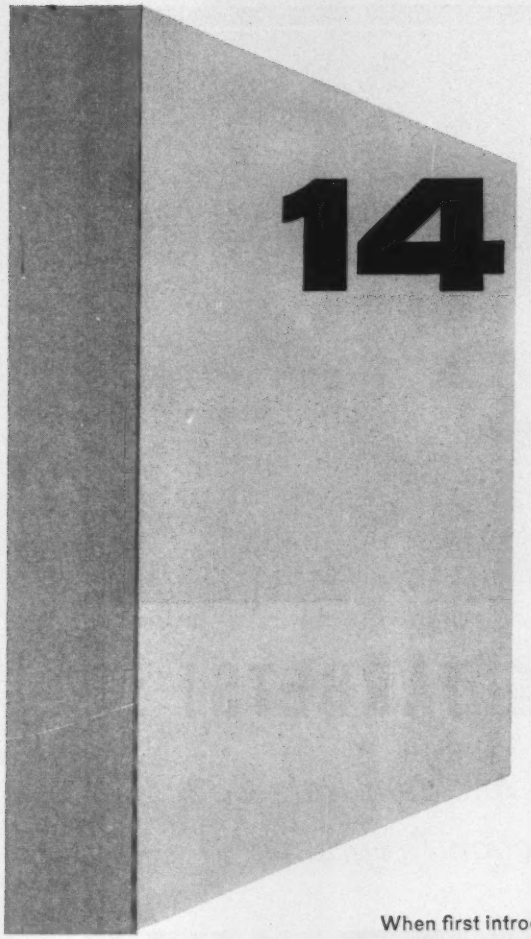
of fully-uniform

DESEGATIZED®

TOOL and DIE STEELS

for Industrial America

Made in U.S.A. by skilled Metalmasters



14 years of pace-setting quality

...it has to be good!

When first introduced in 1946, Latrobe's Desegatized process of manufacture involved new and revolutionary melting techniques. This process established new standards of quality in high speed steels and high alloy die steels. Here were steels fully uniform for the first time . . . no harmful carbide segregation . . . steels free from porosity . . . no weakening centerline inclusions!

Today, over 30 grades of Latrobe's tool and die steels are produced by the Desegatized process. These are available in regular analyses or XL and FM analyses containing properly distributed alloy sulphides for increased machinability. For manufacturers and users of cutting tools and metalworking dies, the full uniformity of Latrobe's Desegatized steels continues to mean extra toughness, greater wear resistance and reliable response to heat treatment.

Latrobe's research and development program continues. Not only will the metalworking industry benefit from better Latrobe tool and die steels, but the rigorous quality standards established through experience have been applied to the field of high strength and high temperature steels and alloys now produced for Space Age applications by Latrobe—Metalmasters for Industrial America.

Have a cutting tool, production die or specialty steel application problem? Call upon *experience* . . . Call Latrobe!

LATROBE
Metalmasters

LATROBE STEEL COMPANY

LATROBE, PENNSYLVANIA

BRANCH OFFICES AND WAREHOUSES:

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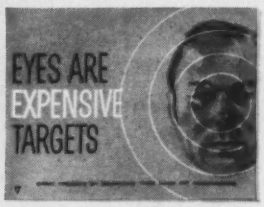
EYES ARE EXPENSIVE TARGETS!

See How Western Electric Cut Eye Accident Rate 36% With Low-Cost AO Eye Protection Program

THE INSTALLATION ORGANIZATION of Western Electric Company employed 15,585 field employees in 1955 and 22,391 in 1958. Operations include erecting steel frames, mounting telephone switching equipment on the frames, cabling, connecting wire ends and thoroughly testing the finished job before turning it over to a Bell Telephone Company. Chief eye hazards are being struck by tools if wire breaks, exposed and protruding wire ends, solder splashes, flash burns and drilling.

In 1955, before a complete eye protection program was installed, the frequency rate for eye accidents was 15.9. In 1958, with all field forces equipped with safety glasses, the frequency rate dropped to 10.2. Frequency rate is the number of accidents times one million divided by the number of working hours.

Yes, industrial eye protection pays off. It saves eyes, pain, grief, skills — and dollars in compensation and medical costs. (In larger companies, dollar savings in five figures annually are not uncommon.) And when you install a program be sure you get the safety you pay for — in *safety standard frames and lenses.* Look for the AO Trademark. Write for new booklet "Eyes Are Expensive Targets".



American Optical
COMPANY
SAFETY PRODUCTS DIVISION
SOUTHBRIDGE, MASSACHUSETTS
Safety Service Centers in Principal Cities

Always insist on AO Trademarked lenses and frames

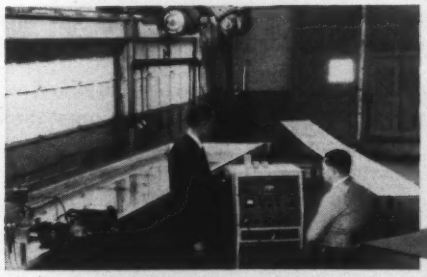
The Man is Sperry Ultrasonics

For years he has collaborated with Grumman's Quality Control Group and engineering personnel in developing ultrasonic test methods and techniques to assure the structural integrity of the material used in carrier-based aircraft.

These nondestructive flaw detection techniques, developed for structures required to withstand rigors of in-fleet service, are now applied to Grumman's new business airplane, the Gulfstream..... "built to withstand fatigue for the equivalent of more than fifty years of operation."

Sperry sales engineers are recognized authorities on the application of ultrasonic techniques in nondestructive testing. They are the link that sparks Sperry research and development teams to create the tools to meet your quality control requirements.

When there is a quality control problem, call the man who is Sperry Ultrasonics.



Quality Control Group inspects Gulfstream wingplank section in Grumman Sonic Laboratory.

Sperry Products Company

DIVISION OF HOWE SOUND COMPANY

302 Shelter Rock Road, Danbury, Connecticut

Work with your AIM*... Detroit Steel Corporation does...
Steel Strapping improves coil handling

DETROIT STEEL CORPORATION, HAMDEN, CONNECTICUT, sought a better way to strap coils of strip steel for shipment. Their Acme Idea Man suggested an Acme Steel Pneumatic Stretcher to secure steel coils to wood pallets. (Idea No. U6-31)

Acme Idea Man A. J. Payne serves many companies with time and money-saving ideas.

Now, with the Pneumatic Stretcher, all coils of steel are palletized with the same constant, even tension. Customers like this improved method since pallets arrive in damage-free condition because of the tighter, more secure straps. Employees like the Acme Steel Pneumatic Stretcher as it reduces fatigue and tiresome hand labor.

***Work with your Acme Idea Man.** His suggestions have saved time, money and eliminated shipping damage for many companies. Contact him at the nearest Acme Steel office. Or write, Dept. IFU-20, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois.
In Canada, Acme Steel Company of Canada, Limited, 743 Warden Avenue, Toronto 13, Ontario.

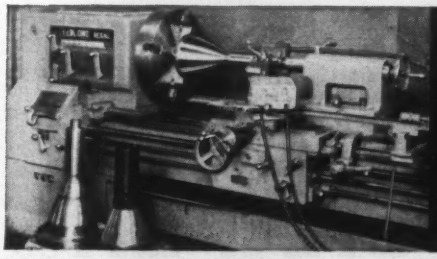
ACME STEEL **STEEL STRAPPING**

PRECISION:

Reason enough to buy LeBlond

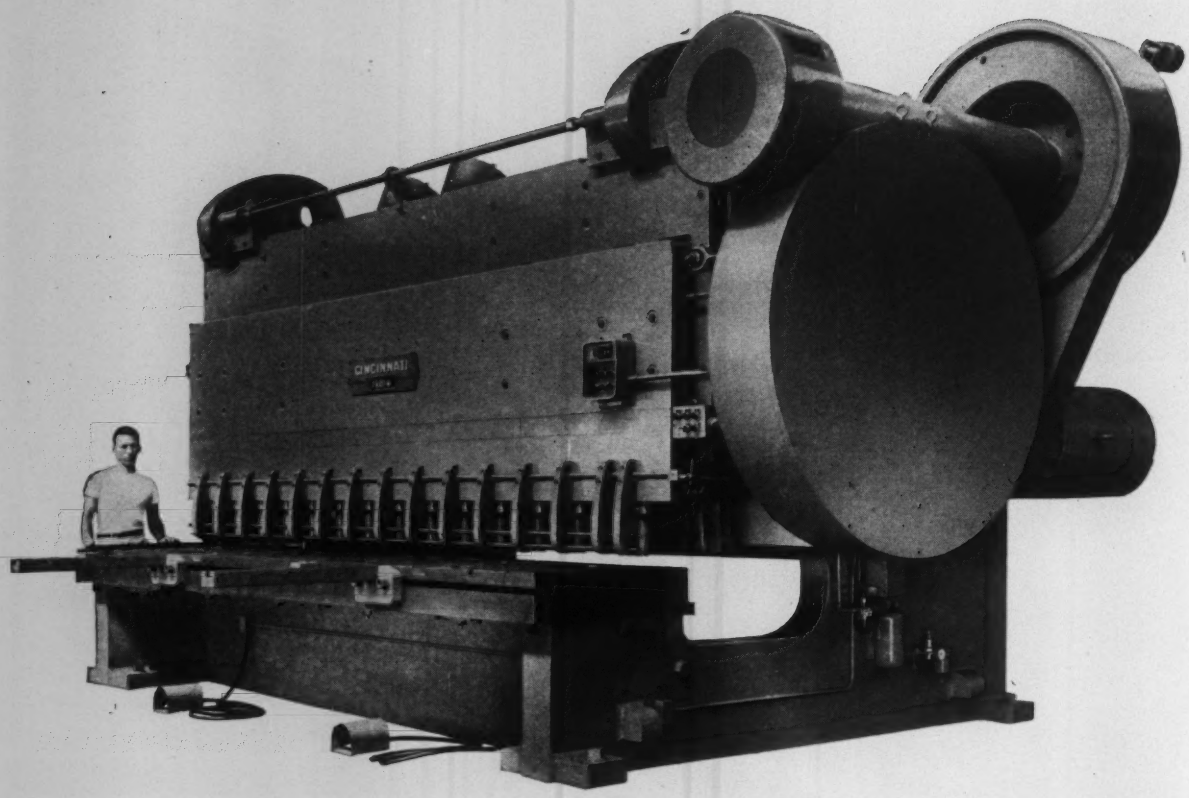
In Hartford, Conn., Delta Corp. chucks a 350 lb. forging of 347 stainless in its tracer-equipped, 24″ LeBlond Regal Lathe. Delta is a specialist in precision sheet metal weldments and exacting machining jobs. When this job comes off the Regal it will be a contoured tube weighing only 18 lb. Its walls will vary in thickness from ⅛″ to 1/16″ according to a rigid and complex pattern. Wall thickness will be held to ±.003″; ID to —.001 +.000; OD to ±.008; and finish will be 20 to 30 rms. If the job is run 3 or 30 times, the same precise result will be achieved—reason enough to buy a LeBlond.

You never hesitate to put this kind of work on a LeBlond Lathe. You know that the sturdiness, the horsepower, the precision is there when you need it. It's what you'd expect from the world's largest builder of a complete line of lathes (and of tracers for lathes, too.)



THE R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

LeBLOND *of Cincinnati*



This CINCINNATI® shears mild steel plate

1¼ in. thick X 14 ft. long

This 15014 Series Cincinnati All-Steel Shear has a 36″ gap and a 48″ back gage range.

Power for heavy cutting with accuracy and operating convenience are combined in this machine.

Modern features such as—hydraulic holddowns, front operated power back gage, hinged back gage angle, automatic pressure lubrication, all-steel interlocked construction, forged alloy steel eccentric shaft—all contribute to an outstanding performance with low maintenance and high accuracy.

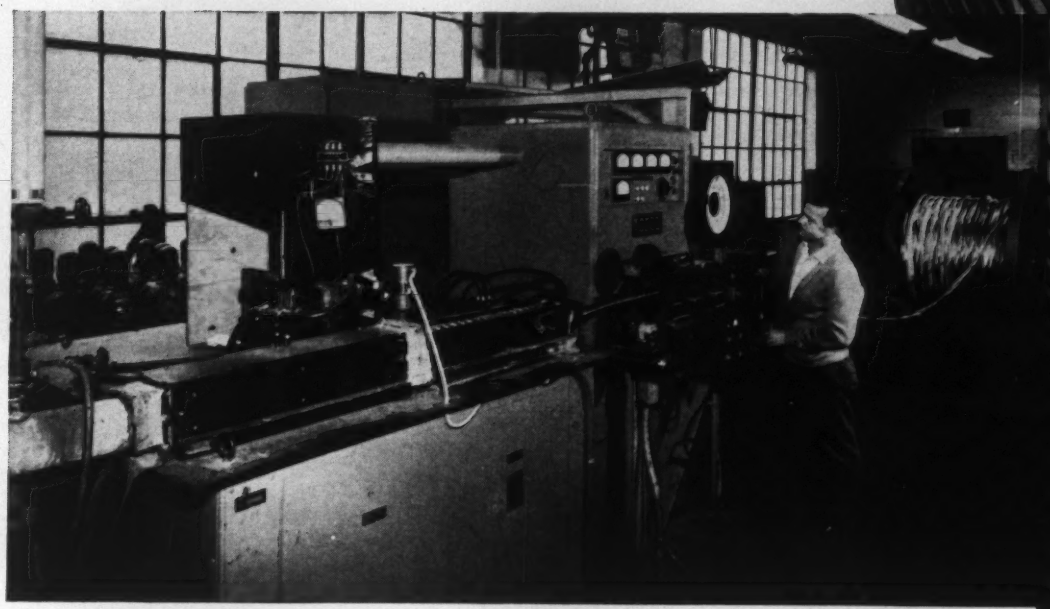
See your Cincinnati representative on heavy or light shearing applications. Write for catalog S-7R.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

How TOCCO* Induction Annealing makes copper cable easier to handle in the field . . .



A world famous manufacturer of quality cable now treats its customers to the best with TOCCO-annealed cable that's easier to reel off, easier to splice and generally easier to handle in the field. Cable segments pass continuously through a TOCCO inductor coil at the rate of 23 feet per minute for the 800 mcm material illustrated. Many sizes of cable segments, up to one million circular mils, are annealed on one TOCCO unit.

TOCCO's many advantages over conventional annealing methods include:

1. TOCCO provides "bright annealing"—no discoloration.
2. TOCCO requires just a fraction of the space of conventional bell-type furnaces.
3. TOCCO's output is nearly four times that obtained by conventional annealing methods.
4. TOCCO equipment requires one operator as opposed to three required for the bell-type furnace operation.

Whether your products involve ferrous or nonferrous materials, look to TOCCO for an economical solution to your metal heating problems—annealing, brazing, hardening, melting or heating for forming or forging operations.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—**NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. A-2, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening, Heat Treating and Annealing."

Name_____

Position_____

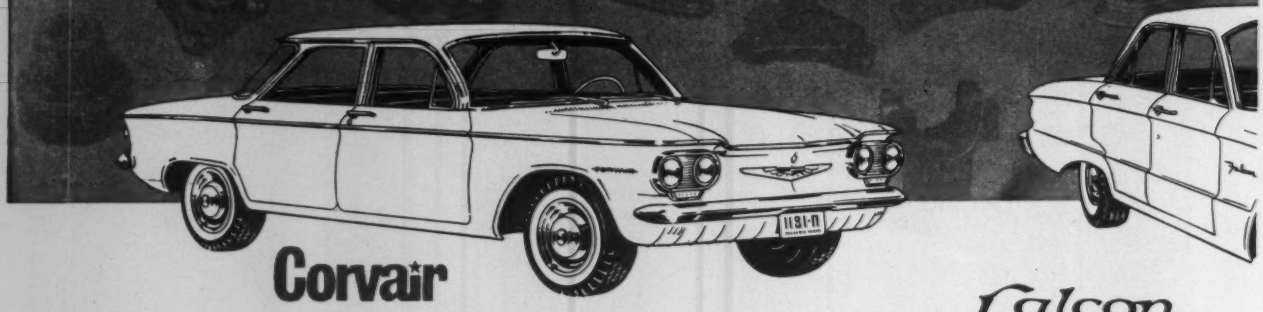
Company_____

Address_____

City_____ Zone____ State_____

Big Three's Little Three

to get Greater Strength for Maximum



Each time a trio of these new cars rolls off the assembly lines at Ford, Chrysler Corporation and Chevrolet, another set of 67 Malleable parts goes into action to give American drivers more dependability, convenience and economy.

Valiant, Corvair and Falcon Use Greater Proportions of Malleable Iron Than the Three Conventional Cars!

Brand new from tread up, the Corvair, Falcon and Valiant are the result of intensive investigation, engineering and testing . . . all done to produce lighter, more economical cars without sacrificing the safety and convenience demanded by the American public.

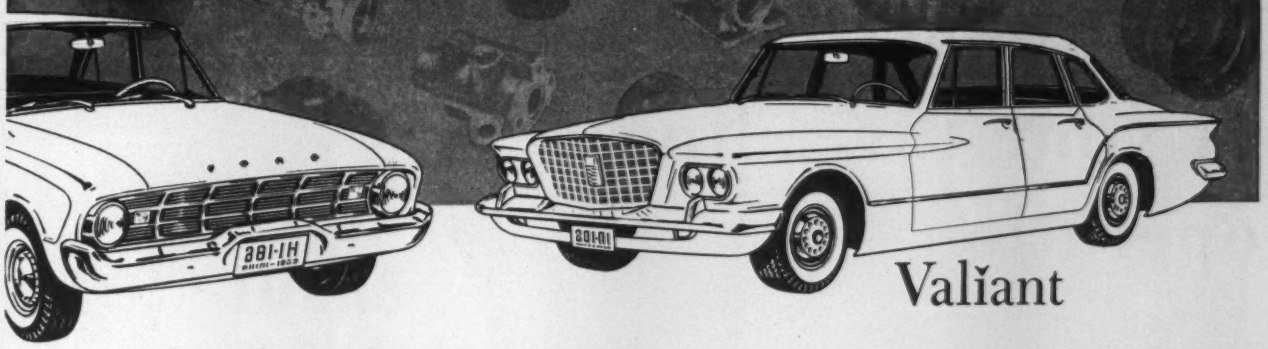
To accomplish this, the automobile industry's

These companies are members of the MALLEABLE CASTINGS COUNCIL

CONNECTICUT
Connecticut Mall. Castings Co., New Haven 6
Eastern Malleable Iron Co., Naugatuck
New Haven Malleable Iron Co., New Haven 4
DELAWARE
Eastern Malleable Iron Co., Wilmington 99
ILLINOIS
Central Fdry. Div., Gen. Motors, Danville
Chicago Malleable Castings Co., Chicago 43
Moline Malleable Iron Co., St. Charles
National Mall. and Steel Castings Co., Cicero 50
Peoria Malleable Castings Co., Peoria 1
Wagner Castings Company, Decatur
INDIANA
Link-Belt Company, Indianapolis 6
National Mall. & Steel Castings Co., Indianapolis 22
IOWA
Iowa Malleable Iron Co., Fairfield
MASSACHUSETTS
Belcher Malleable Iron Co., Easton

Rely On MALLEABLE

with Less Weight Operating Economy....



three newest creations use *more* Malleable in proportion to total materials than all other models of the same manufacturers. Why? Malleable provides *more strength per dollar* than any other metal, ferrous or non-ferrous. Malleable castings have *more strength per pound* than "light" metals. Being the *most machinable of all ferrous metals* of similar properties, Malleable speeds production . . . produces better parts. Malleable castings have proved uniquely dependable for critical applications in millions of cars now on the highways.

How many places are there in your operations where Malleable castings can improve your products and reduce your costs? Check now . . . send drawings or an outline of your requirements to any of the progressive Malleable castings producers who display this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

Union Commerce Building, Cleveland 14, Ohio

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division
Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

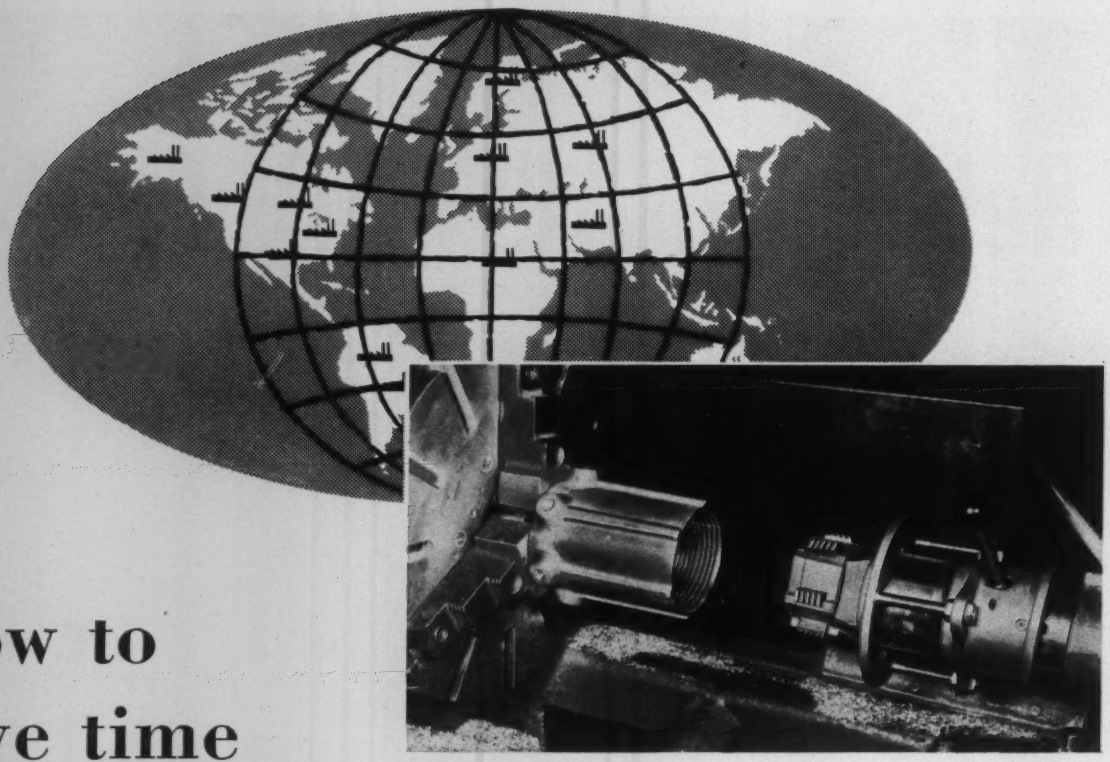
OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46



How to save time in your threading operation

Plants everywhere save valuable time in threading operations using Landis Equipment. For example:

A LANDIS ALT COLLAPSIBLE TAP produces coarse pitch threads in less than a minute in one pass at the Holys Manufacturing Co., Forest Park, Ill. The ability of the LANDIS Tap to tap large diameter coarse pitch threads requiring heavy metal removal *in one pass* reduces threading time.

Material: SAE 63 naval bronze casting
Thread Specifications:

Diameter	4.640"
Length	4-1/4"
Type	4 pitch modified square

Equipment: LANDIS 5ALT Tap with a 4-1/2" tap head on a No. 5 Gisholt turret lathe.

This installation is but one example of the hundreds of plants that are receiving the time-saving (money-saving!) benefits of the various types of Landis Threading Equipment. Over fifty years of development and manufacturing experience by the Landis Machine Company, a corporation devoted to the exclusive manufacture of threading equipment, is behind every Landis threading machine or tool. Take advantage of our technical and practical experience in Thread Cutting, Rolling, Tapping and Grinding.

LANDIS *Machine* COMPANY
WAYNESBORO • PENNSYLVANIA

545

BOOK SHAPE OF THE MONTH

Illustrated, greatly reduced, are a few ideas that have taken shape in metal.

MAIL THE COUPON FOR FREE OPEN SHAPE CATALOG

48 page catalog OS-1059 illustrates (actual size) over 500 roller die, cold formed metal shapes for which rolls and dies are on hand thus eliminating tooling costs to the purchaser of any of the shapes illustrated.

Van Huffel Tube Corporation, Warren, Ohio

Please rush me Open Shape Catalog No. OS-1059.

Name ..... Title .....

Company .....

Street Address .....

City ..... Zone .. State .....

VAN HUFFEL TUBE CORPORATION ... WARREN, OHIO

LINK-BELT SS CLASS DRAW BENCH CHAIN

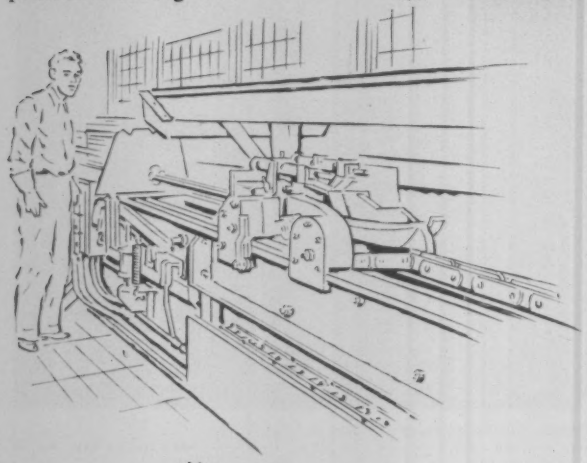
gives longest chain life . . . resists highest chain pull

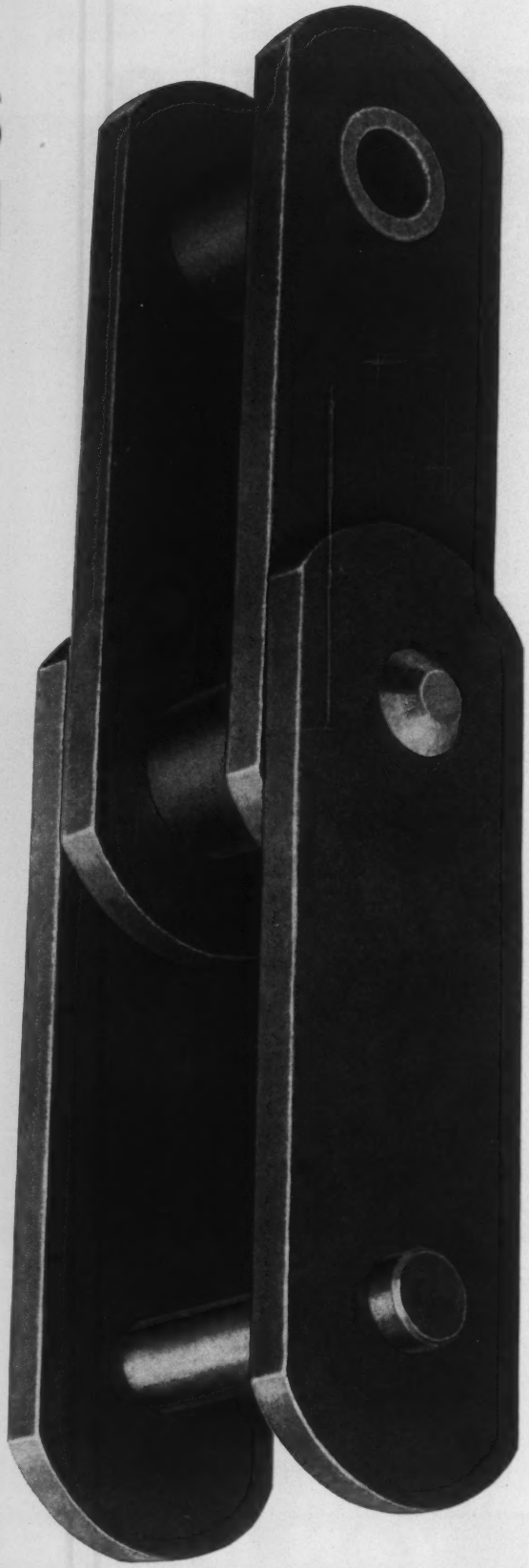
Link-Belt SS Class draw bench chains won't give in—whether they're used on benches having capacities of 5000 lbs., 100,000 lbs. or greater. Parts are accurately machined, after hardening, by a special process that assures longer chain life on even the highest chain pull applications.

These rugged chains, of all-steel construction, are available in a variety of pitches and strengths to suit any draw bench requirement. Chains, such as the one illustrated, have hardened pins, bushings and sidebars. Pins and bushings are securely locked in the sidebars by controlled press fits. Block type chain, with hardened pins and sidebars, is also available. Pins on this chain are also securely locked in the sidebars by controlled press fits and sprocket contacting surfaces of the block links are accurately machined to assure proper tooth engagement.

For further facts, call your nearest Link-Belt office or stock-carrying distributor, listed under CHAINS in the yellow pages of your phone book. Or write for our new comprehensive Catalog 1050.

15,067





LINK-BELT

CHAINS AND SPROCKETS

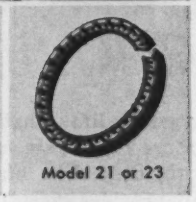
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

ENGINEERED OIL SEALS for Steel Mills

Model 64

Model 142

Model 53



Model 21 or 23

FULL BEARING PROTECTION IN SEVEREST ATMOSPHERES

Everywhere in steel—on hot and cold strip mills, blooming and structural mills—Garlock KLOZURE* Oil Seals prevent leakage of vital bearing lubrication. And they further prevent damage to the bearings by sealing out scale, spray, dirt, and other foreign matter.

For example, Model 142, a face-type KLOZURE, is designed to seal surfaces perpendicular to shaft . . . keeps water splash and scale out of bearings at the shoulder of mill rolls. Models 64 and 82 are applied to large shafts at normal or high speeds . . . ideal for protecting bearings on back-up and work rolls. Model 53 withstands temperatures up to 250°F at normal or high speeds . . . recommended for table rolls. Where equipment can't be dismantled easily, Models 21 or 23 Split-KLOZURES are the choice.

All KLOZURES are oil and grease resistant . . . impervious to water, mild acids, alkalies . . . non-abrasive . . . withstand temperatures from −40°F to +250°F. For extreme conditions, Garlock furnishes sealing elements resistant to practically any fluid, and serviceable as high as +500°F.

Sealing Element, case, spring, and adapter on KLOZURES are designed for peak efficiency and durability. Garlock, with 70 years' experience and modern production facilities, manufactures KLOZURE Oil Seals in proper design and to extremely accurate dimensions from materials which are best suited for your application. Engineering skill, vast experience, and mass production know-how bring you the finest oil and grease seals available.

Obtain more information by calling the nearest of Garlock's 26 sales offices and warehouses throughout the U.S. and Canada. Or, write for KLOZURE Catalog 30. The Garlock Packing Company, Palmyra, N.Y.

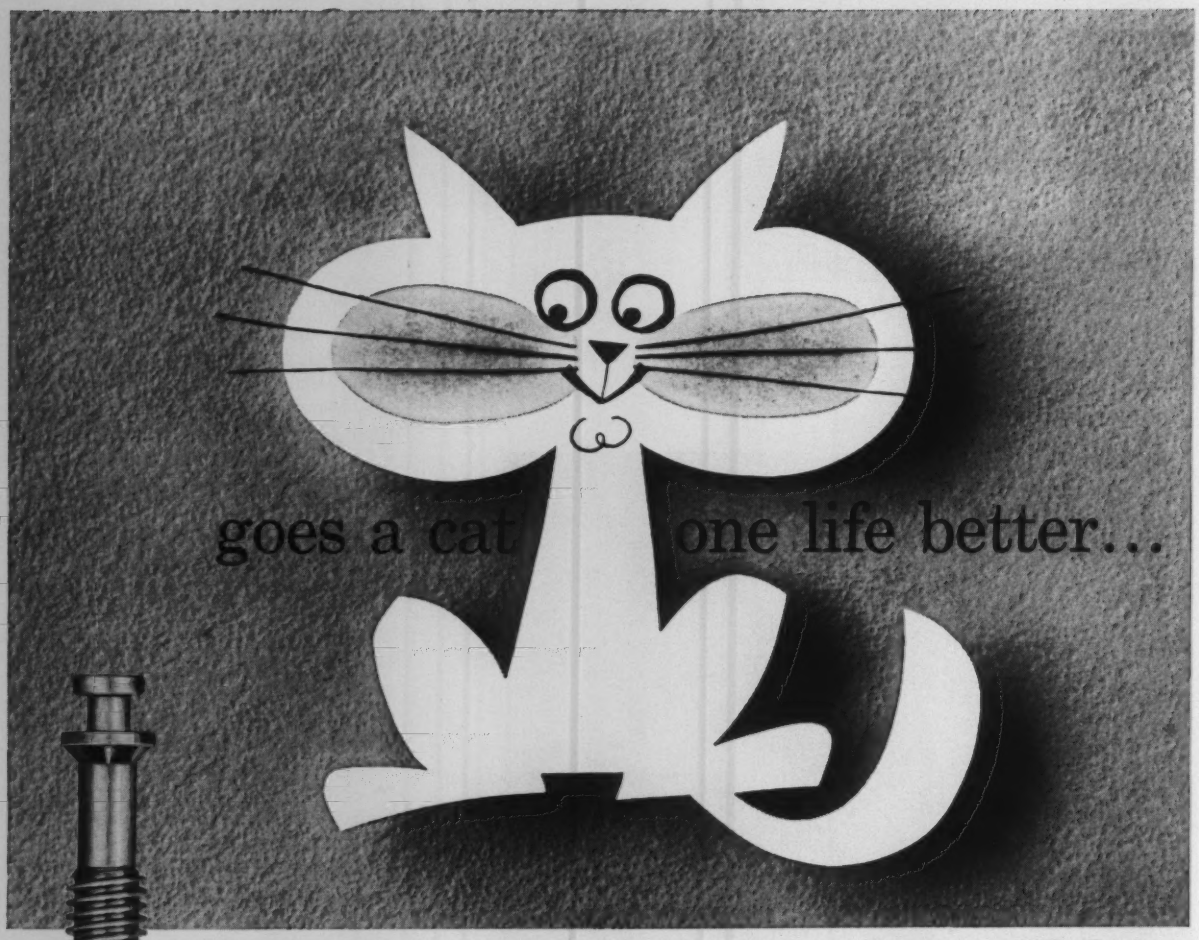
GARLOCK

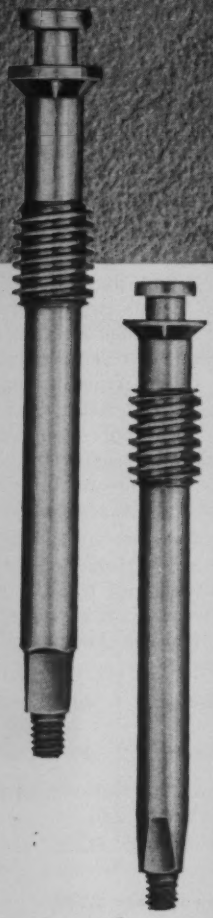
Canadian Div.: The Garlock Packing Company of Canada Ltd.

Plastics Div.: United States Gasket Company

Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.

*Registered trademark

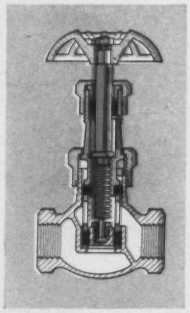




Bridgeport Duronze 707

A tenfold increase in service life... that's the outstanding contribution made by Bridgeport's Duronze 707 to gate valves manufactured by Ohio Injector Company, Wadsworth, Ohio. The big difference is in the valve stems. Duronze 707 not only provides exceptional strength in the stems, but also eliminates risk of seizing or galling. Thread wear is kept to a minimum. In addition, this corrosion-resistant alloy offers an important manufacturing advantage in good machinability.

The toughest valve stems the industry has ever known were evolved through close cooperation between Bridgeport and Ohio Injector metallurgists. This type of cooperation is open to all manufacturers. It means that a *standard* alloy can often be chosen to provide the most effective and economical solution to product or production problems.

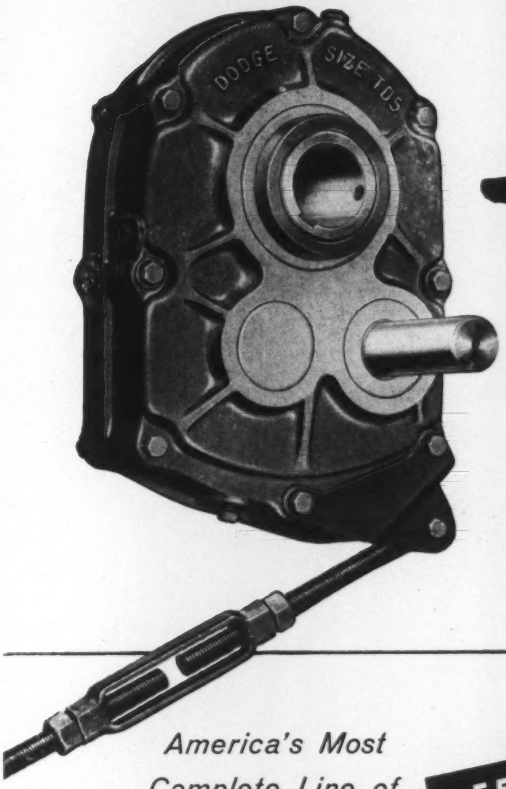


Bridgeport Technical Service will gladly advise you on any problems involving metals and their application. Just call your nearest Bridgeport Sales Office—or write directly to Bridgeport Brass Company, Bridgeport 2, Conn., Dept. 3402.

BRIDGEPORT BRASS COMPANY

Bridgeport 2, Connecticut

Specialists in Metals from Aluminum to Zirconium



Torque-Arm

THE DODGE DEVELOPMENT THAT CHANGED THE NATION'S HABITS OF SPEED REDUCTION

America's Most Complete Line of Shaft Mounted Speed Reducers

55 MODELS

- Capacities up to 170 hp
- Output speeds from 10 to 378 rpm!
- Single Reduction
- Double Reduction
- 5 to 1 Ratio
- 15 to 1 Ratio
- 25 to 1 Ratio
- Any speed ratio up to 150 to 1 obtainable by selection of pre-determined combination of reducer and V-belt drive.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

In fewer than ten years, the range of Torque-Arm Shaft Mounted Speed Reducers has increased from 6 to 55 models, to meet the ever increasing demand for this improved method of speed reduction.

By eliminating foundation, sliding base and flexible coupling this modern speed reducer has saved untold installation time and untold dollars of cost.

The rugged semisteel housing developed by Dodge has never been improved upon. It is corrosion resistant—and it has the strength to hold bearing seats in line for the life of the unit.

Dodge design provides wide spacing for the bearings. Loads are carried easily, contributing to Torque-Arm's long life and very high efficiency. The gears are finest quality—helical, heat treated steel.

Torque-Arm mounts vertically or horizontally in any position around the driven shaft. It locks to the shaft on *both* sides of the housing. The holes in the output hub provide simple removal with puller. Overload release and built-in backstop are optional.

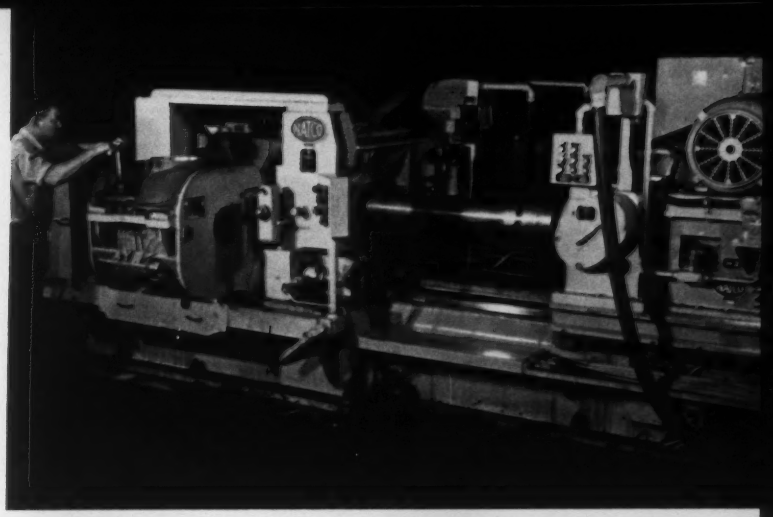
Dodge Torque-Arm is America's most widely used shaft mounted speed reducer. It is stocked by your local Dodge Distributor. Ask him. Or write us for bulletin.

DODGE MANUFACTURING CORPORATION, 800 Union, Mishawaka, Ind.

DODGE
of Mishawaka, Ind.

NATCO

Flopover cradle makes for unobstructed top loading. Holes are bored in two directions without change of setup in this off-highway truck differential carrier assembly.



L-shaped Natco special for boring right-angle holes has both rough and finish cycles. It handles two sizes of parts.

Handling Ease Alone Justifies This Natco Special

This husky Natco does one job well—It bores big holes in hard-to-handle, heavy cast steel parts.

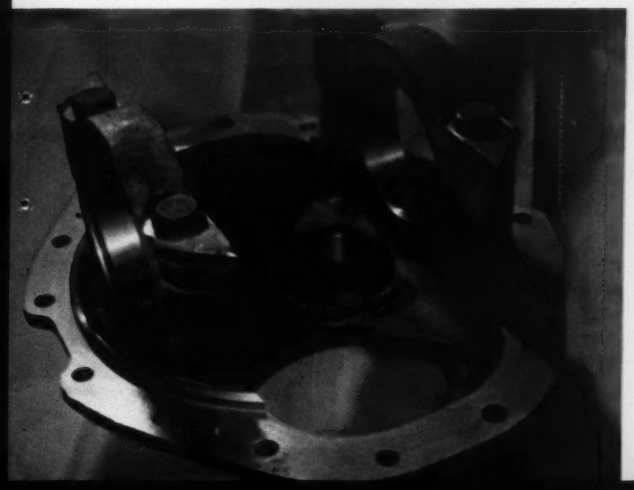
International Harvester Co., Melrose Park, Ill., cuts handling time in half with this Natco special, and look what else it gets: better finish on the bores, longer tool life, improved alignment, tighter tolerances, and more parts per hour. In short, higher quality and greater productivity. And a standard boring mill is released for general purpose chores.

For such extra benefits from specials, call your Natco representative today.

NATCO

The National Automatic Tool Company, Inc., Richmond, Indiana

Only two boring bars with expanding bit heads are needed to bore these several different diameters and faces.



Bits expand from boring heads. Head entering at top bores 4.725″ and 10.250″ holes at the same time.

AVAILABLE IN ¾" AND 1¼" CAPACITIES. Shown at right is Model 18-B-7 with ¾" rated capacity. Write for Bulletin 18-11.

NEW

GARDNER-DENVER IMPACT WRENCHES

Model 18-B-9 impact wrench with 1¼" rated capacity. Write for Bulletin 18-15.

hit harder...last longer

Here are two new lightweight, easy-to-use impact wrenches that hit harder—yet don't wear themselves out. They're the result of intensive Gardner-Denver engineering to develop a powerful, long-lasting impact mechanism. The combination of a fast-accelerating air motor and a new, patented clutch mechanism assures positive starts, efficient impacting and lowest maintenance.

And look at these big advantages: light weight—lowest weight possible consistent with high-power output . . . easily disassembled for service . . . no torque reaction . . . reversing lever protected from accidental engagement but readily accessible when needed.

For *your* production or maintenance jobs, get the complete story on the new Gardner-Denver impact wrenches. Contact your nearby Gardner-Denver air tool specialist or write for bulletins.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

UNITED®

4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

UNITED ENGINEERING AND FOUNDRY COMPANY
PITTSBURGH, PENNSYLVANIA

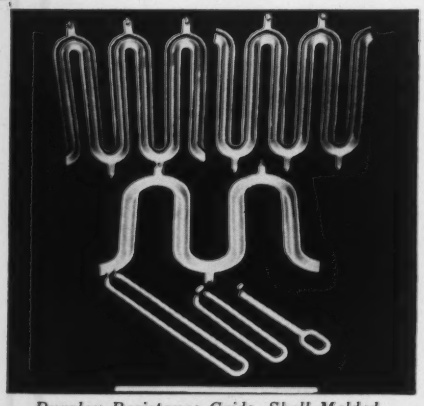
Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

Duraloy Tubes and Grids *to Meet Exacting* THE ELECTRIC EF FURNACE CO. GAS • OIL • ELECTRIC *Specifications*

Duraloy Centrifugally Cast Tubes 7'9" long, 7" O.D., ⅜" wall. 28 Cr 10 Ni; some of HOM alloy.



Duraloy Resistance Grids—Shell Molded. 18 Cr 38 Ni; some of special HOM alloy.

Heat treating furnaces need high alloy castings... radiant heat tubes for gas or oil fired... resistance grids for electrical... and castings for handling material through the furnace. *And the castings must be fail-proof!*

One reason—indeed the major reason—why The Electric Furnace Company, Salem, Ohio, has leaned so heavily on Duraloy for its castings is that over the years Duraloy Castings have established a fine record for durability and uniformity. And with the recent development of Duraloy HOM, the furnace company can work towards higher temperature operations. HOM can be used quite broadly at temperatures up to 2200°F and in a limited way to 2300°F. It can be cast statically, centrifugally and shell molded.

When such an authority on heat treating furnaces as Electric Furnace so consistently selects Duraloy castings for these furnaces on which it has built an enviable reputation... that preference suggests quite strongly that Duraloy castings are consistently sound and skillfully alloyed to meet exacting high temperature applications. This same skill offers comparable values to all who require high alloy castings.

Annealing furnace designed and constructed by The Electric Furnace Company used for cycle annealing of enameling iron strip and bright annealing of cold rolled strip. Three methods of heating: direct fuel fire; fuel fired radiant heat; and electric resistance used in the various zones.

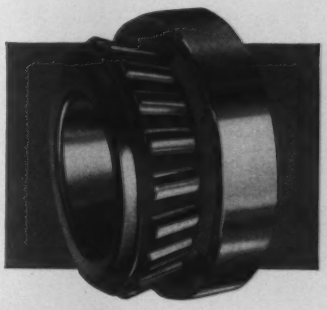
The DURALOY Company

OFFICE AND PLANT: Scottdale, Pa.

EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
ATLANTA OFFICE: 76—4th Street, N.W.
CHICAGO OFFICE: 332 South Michigan Avenue
DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

Bearings "keep cool" under hot steel!

Watch it! Coming down the line—another half-formed slab of red-hot steel! And with it comes a supreme test of bearing excellence. Bower bearings are equal to it—helping to keep this mill operating smoothly and continually despite heavy loads and extreme temperature. Whatever the job, there's a Bower bearing engineered to perform just as dependably when the going is toughest. Rigid quality controls and basic bearing design refinements have reduced Bower bearing failure to a practical minimum. If your product uses bearings, specify Bower! There's a complete line of tapered, straight or journal roller bearings for every field of transportation and industry. Bower Roller Bearing Division, Detroit 14, Michigan.



BOWER
ROLLER BEARINGS

tapered
cylindrical
journal

DIVISION OF
FEDERAL-MOGUL-BOWER
BEARINGS, INC.

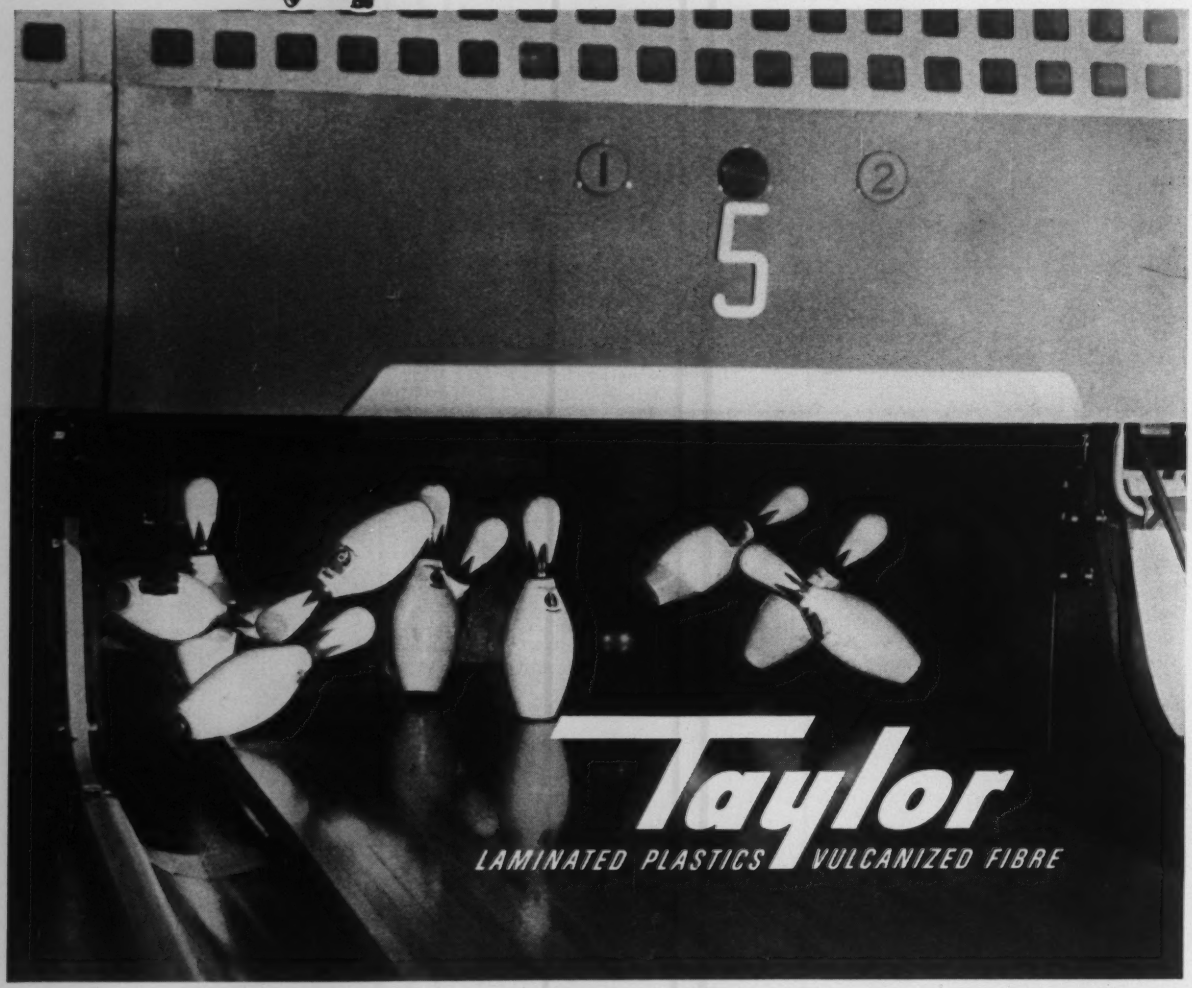
New "Taylorite"® is a veritable workhorse

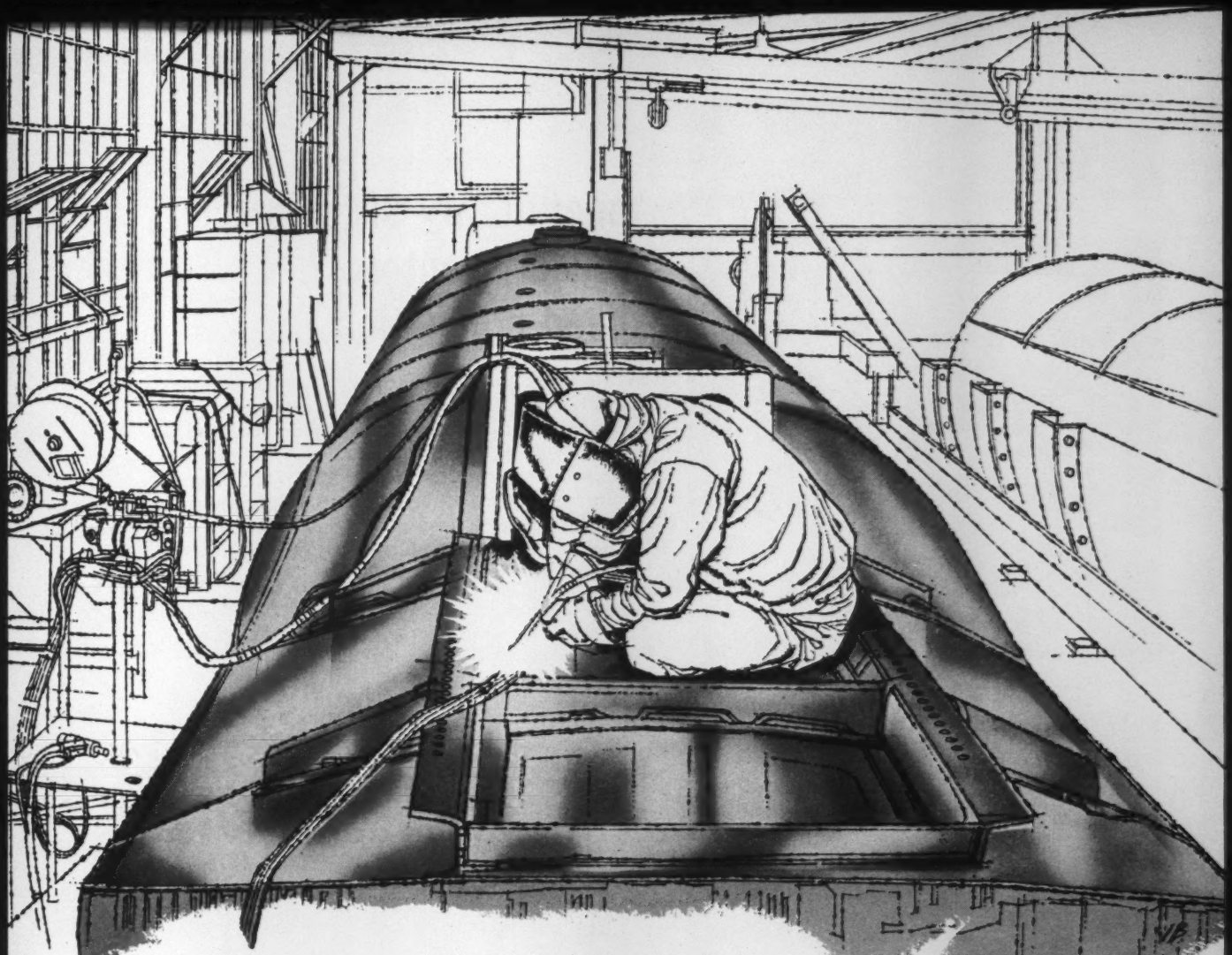
Improved Vulcanized Fibre has new flexibility, new uniformity, new structural strength to fit it to even broader application in many fields

There has been a big change in Taylor Vulcanized Fibre, including the name. New processing equipment and atmosphere-controlled storage facilities have enabled us to make major advances in overall uniformity —from lot to lot and at no increase in cost to you. Taylorite has wide use as an insulating and structural material for electrical and electronic applications. But it is being put to service in many other ways, too. A good example is choice of Taylorite as kick-back plates in bowling alleys. Here it must withstand the constant pounding of flying pins without structural breakdown or damage to the pins. And it is doing its job perfectly.

Find out how new Taylorite Vulcanized Fibre can help improve your products and cut costs. Send for samples. Test them for yourself. Put them under tension, flex them, compress them, form them. You will find that Taylorite passes your severest tests with flying colors. Write for Data Sheet 2-0 and samples today. Taylor Fibre Co., Norristown 52, Pa.

KICK-BACK PLATES of Taylorite give good pin action, prevent pin damage





Formula for Success

The formulation of a stainless steel alloy requires as much precision as any chemical compound. All the care exercised in the selection of a particular alloy can be nullified by variations in the analysis specified.

During fabrication, for example, slight differences in chromium-nickel: carbon ratios can cause changes in microstructure which lead to early failure.

That's why it is safer to specify J&L Consistent Quality Stainless Steel. J&L leads the industry in melt shop standards for stainless steel—the point where quality starts, **and longer service life begins.**

Plants and Service Centers:
Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit

STAINLESS
SHEET • STRIP • BAR • WIRE

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • Box 4606, Detroit 34

Yoder Rotary Slitters reduce inventory... speed production

To help meet the demands of tight production schedules, YODER Slitters reduce mill-width stock quickly and economically to desired widths. If your needs are as low as 100 tons per month, time and manpower savings alone will offset the cost of your YODER Slitter in a matter of months, while reducing basic inventories. Compactly designed, standard YODER Slitters are built to handle standard coil widths...completely engineered lines for special requirements.

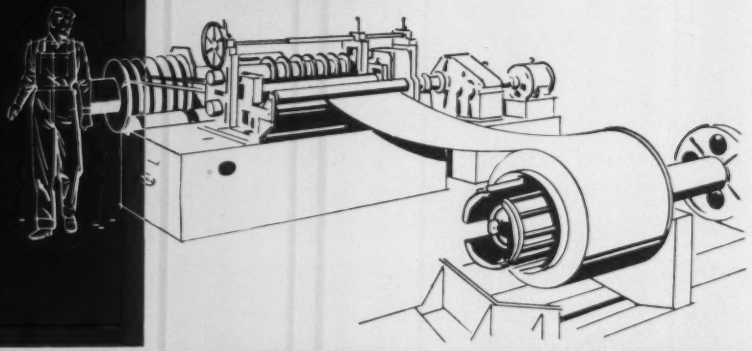
YODER accessories, such as coil cars, swivel unloaders, scrap choppers, scrap disposers, plate levelers and coil boxes, make stock handling fast and easy.

YODER also makes a complete line of Cold Roll-Forming equipment and Pipe and Tube Mills. To profit from YODER'S years of engineering and service experience, contact your local YODER representative or send for the YODER Slitter Manual.

THE YODER COMPANY

5510 Walworth Avenue • • Cleveland 1, Ohio

Investigate the many advantages of YODER-engineered Slitter Installations. Write today for this comprehensive, 80 page YODER Slitter Manual ...it's yours for the asking!



ENGINEERING **YODER** MANUFACTURING

ROTARY SLITTING LINES

PIPE AND TUBE MILLS (ferrous or non-ferrous)

COLD ROLL FORMING MACHINES

ALCAN extrusion ingot gives you these 4 dollar-saving advantages!

1. Better finish! 2. Greater extrudability! 3. Higher recovery! 4. Longer die-life! . . . four important reasons why ALCAN extrusion ingot may be far more economical than the billet you're now using!

How much will this better quality billet save? For an exact answer test-run ALCAN billet on your own equipment. Carefully measure its performance and true cost. See how much easier and faster it extrudes. How it reduces scrap and lengthens die-life. How it actually makes a difference in the quality of your finish.

From mining to casting—countless checks on quality make ALCAN the finest of all billet products. It is made entirely of clean, primary metal . . . unexcelled in internal structure and surface smoothness . . . and cast to the industry's closest tolerances.

Telephone our nearest office today about testing ALCAN billet on your own equipment! We welcome the opportunity to show you the difference it can make in your extruding costs and productivity.

Aluminium Limited

Ingot Specialist...serving
American Aluminum Fabricators—

In the U.S.—Aluminium Limited Sales, Inc., 630 Fifth Avenue, N.Y. 20, N.Y.
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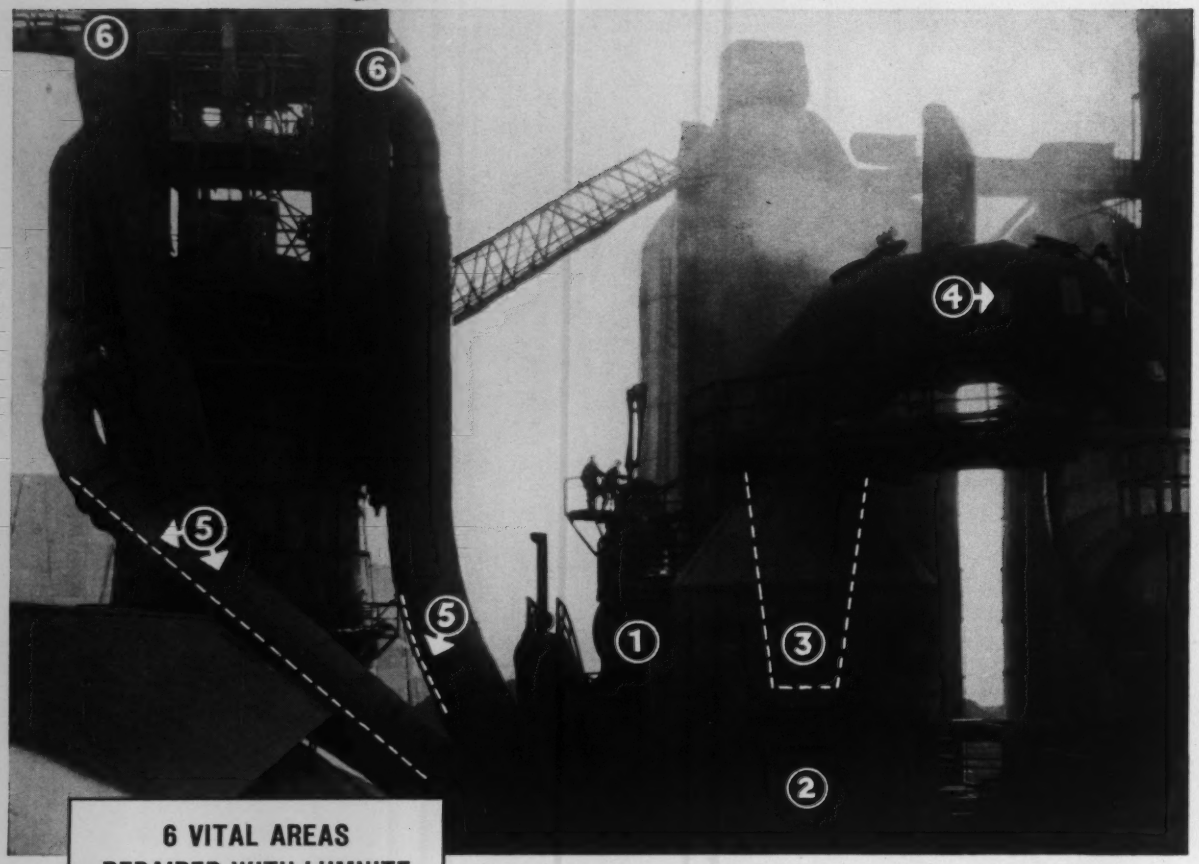
Additional distribution (Alcan Foundry Alloys):
Apex Smelting Company, Chicago, Cleveland, Los Angeles
Charles Batchelder Co., Inc., Botsford, Conn.

Industrial concretes protect blast furnace "hot spots"



6 VITAL AREAS REPAIRED WITH LUMNITE

gun-applied industrial concretes in blast furnace downcomers and dust separator, National Tube Div., U. S. Steel, McKeesport, Pa.

1. **Dust catcher,** spot repairs to brick lining.
2. **Dust separator** shell, complete lining.
3. **Inner cone,** complete lining.
4. **Elbows and piping,** lined for 65 lineal feet.
5. **Downcomers,** gunited for 120° arc in pipe bottom.
6. **Connections between uptakes and downcomers,** spot-repaired (two other connections gunited not shown).

For repairs or new installation, industrial concrete linings in blast furnace equipment solve many abrasion, erosion and heat problems. In addition, these monolithic concrete linings provide insulation. Made with LUMNITE calcium-aluminate cement and suitable aggregates, concrete linings are easy and economical to place – by guniting, casting or troweling. Unit downtime is reduced because concrete reaches service strength in 24 hours. For greater convenience, castables containing LUMNITE cement are available from leading manufacturers of refractories. These are packaged mixtures, ready to use by adding only water. For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, New York.

"USS," "Atlas" and "Lumnite" are registered trademarks.

L-199

Universal Atlas Cement
Division of
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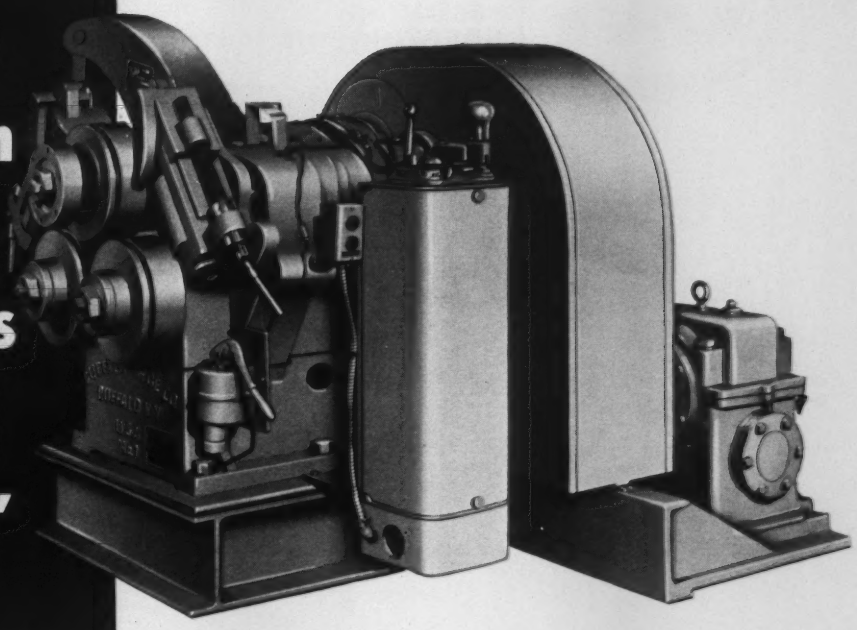
OFFICES: Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco

Put Your Production Bending Operations "IN THE BLACK"



with BUFFALO BENDING ROLLS

These fast, accurate, dependable machines quickly bend circles, segments and spirals. They handle angles, rounds, squares, tubes, beams, channels, flats and special shapes. Easy roll changes eliminate need for expensive dies. Hydraulic top roll adjustment saves setup time.

Like all Buffalo products, Bending Rolls are quality engineered and built throughout. Unique speed reducer eliminates gearing, delivers more power in compact space.

Exclusive Buffalo "Leg-In" Attachment simplifies bending of angles leg-in. Saves time because work will not twist or get out of square. Acts as a gauge when rolling a run of circles to same diameter.

The complete line of Buffalo Bending Rolls includes models and sizes to handle all types of work. The model you need could be saving you production and maintenance dollars **right now!** For full details call your Buffalo machine tool dealer, or mail coupon today.

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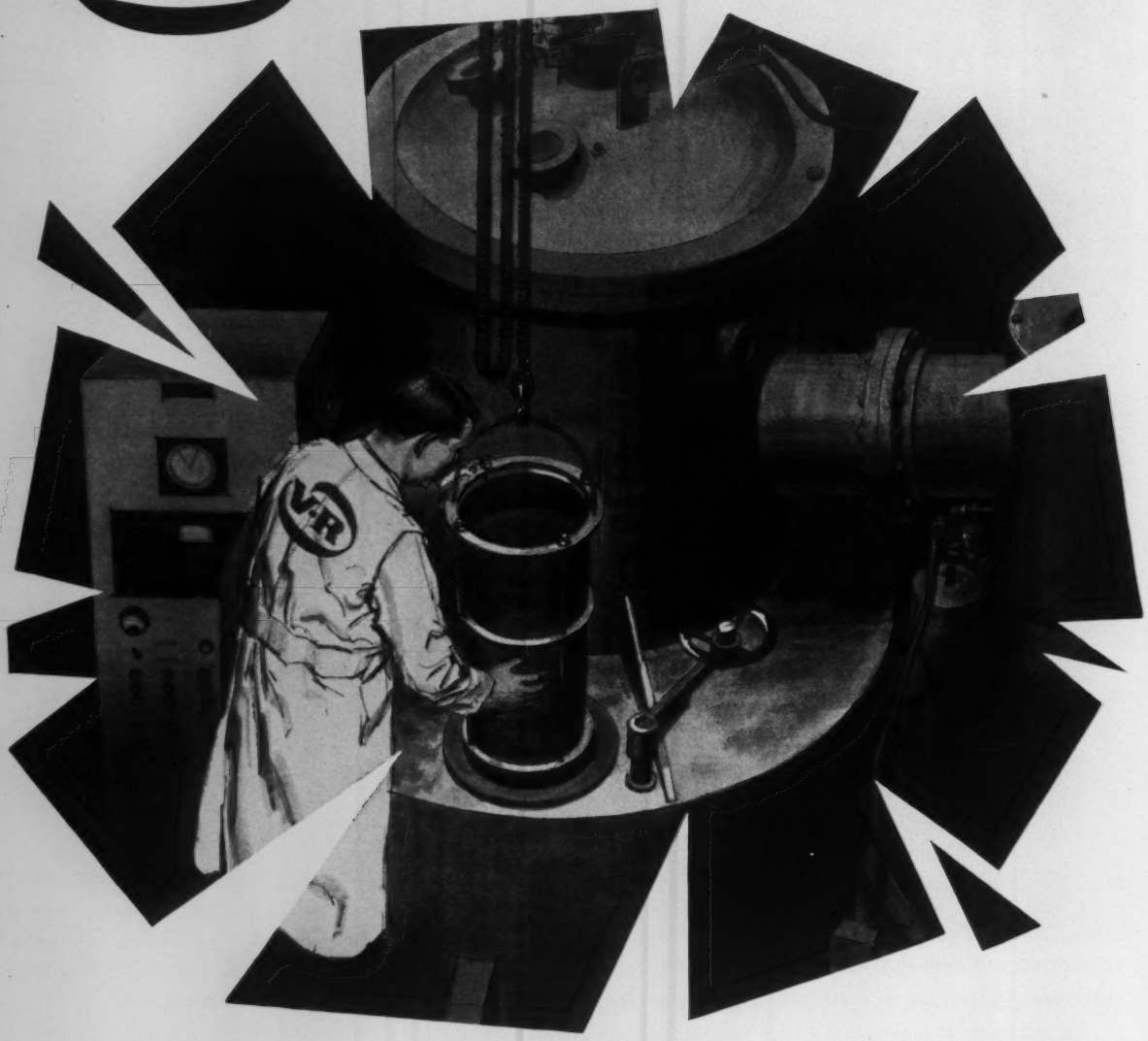
V-R

CREATING THE METALS THAT SHAPE THE FUTURE



V-R vacuum sintering makes better carbide

Vacuum sintered steel cutting carbide grades are more versatile because precise control during vacuum sintering removes trace impurities . . . increasing the strength of V-R carbides and their ability to withstand cutting conditions which generate extreme heat. Vacuum sintering is one of the many reasons for the superior performance of V-R's new carbide grades for machining all types of steel and the new superalloys. At V-R, the finest in modern equipment is effectively combined with the metallurgical knowledge gained through 30 years of carbide research and manufacturing experience . . . experience that means better carbide for every use.

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lubrication is a management responsibility

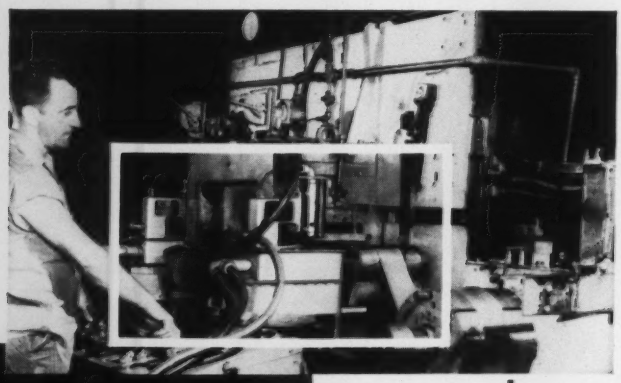
MANAGEMENT *does* have a stake in good lubrication practices.

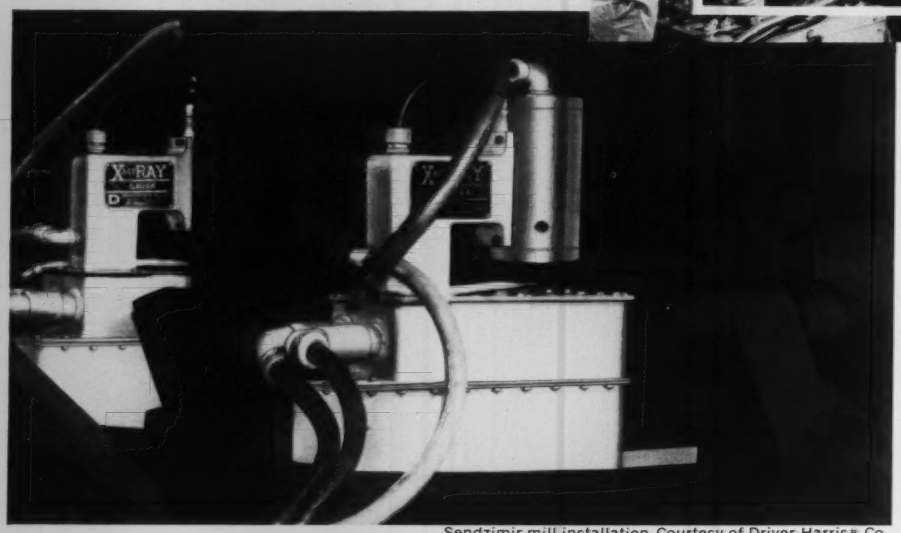
If you recognize lubrication for what it is — a cost-reducing tool, not an expense item — you can effect savings that add up to many hundred times the cost of the lubricants themselves. Yet only management has the authority to make these potential savings an actuality. That's why lubrication is your responsibility. **Texaco can help you achieve these savings.** Texaco Lubrication Engineers have had valuable experience in tailoring Organized Lubrication Programs to the needs of virtually every industry. They can help show *you* the way to important savings. Why not talk to your nearest Texaco Lubrication Engineer today — or write for our new Book "Organized Lubrication — Major Cost Control Factor."

Texaco Inc., 135 East 42nd Street, New York 17, New York. Dept. IA-140

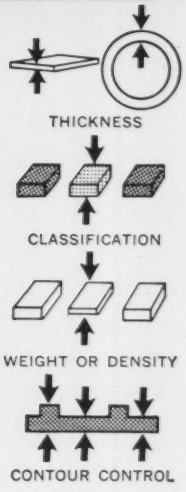
LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

keep an x-ray "eye" on your metal-rolling costs . . .





Sendzimir mill installation Courtesy of Driver-Harris® Co.



XACTRAY NON-CONTACT THICKNESS GAUGES

BOOST YEAR-ROUND PROFITS WITH SPEED AND PRECISION

XactRAY gauges have long been noted for their accuracy in providing absolute thickness measurement of metal on-the-fly. Now they're winning recognition for another great operating characteristic as well—economy—and more and more metal men are discovering why!

Compact and efficient, these gauges require little attention, either for operation or maintenance. And they can be installed practically anywhere in the mill, even close to hot equipment, without upsetting the process line. Mountings are custom built to fit particular requirements.

Continuous XactRAY gauging, coupled with automatic controls and/or alarm devices, saves man-hours and millhours...gives measurements to tolerances as close as ±.000010" whether the metal is moving at 6 or 6,000 feet per minute. Material can be put "on-gauge" in fractions of seconds, and the response to thickness deviations is faster than with most other non-contact gauges. This leads to further savings through reduced scrap.

Whatever your measurement...foil, plate or sheet ...ferrous or non-ferrous metals and alloys...you'll find XactRAY can contribute to your own dollar savings. Further economies can be effected through the addition of XactRAYMATIC controls.

Write for the latest literature giving full information on the cost-cutting advantages of XactRAY gauges. It's yours for the asking through your local Weston representative...or write to Weston Instruments Division, Daystrom, Inc., Newark 12, N. J. *In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 19, Ont. Export: Daystrom Int'l., 100 Empire Street, Newark 12, N.J.*

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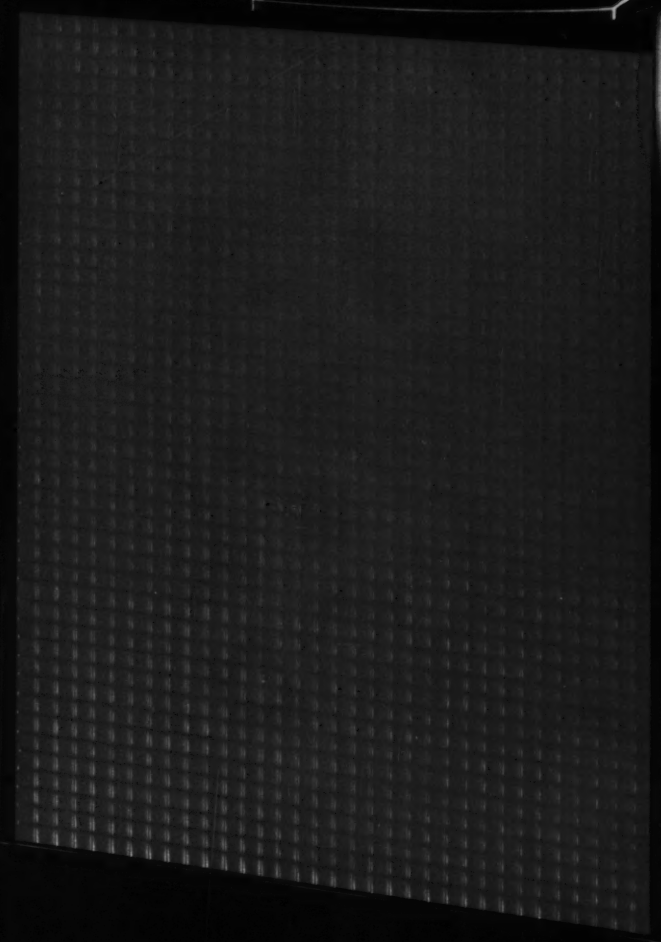
WESTON INSTRUMENTS DIVISION
World leader in measurement and control

Just a touch tells you—

how this
Mary Proctor
Toaster
took on new

sales appeal



Gold-finished panels of USS American Embossed Amerstrip add richness, smart modernity to classic toaster lines

New Proctor Electric Company toaster styled by Raymond Loewy Associates has special design USS Embossed Amerstrip

This Mary Proctor toaster is beautiful—and different. On the sales counter it stands out from its competitors. Much of this sales-pulling distinction lies in the end panels formed from gold-finished, geometric-patterned Embossed Amerstrip. This effective pattern was created by famous industrial designers, Raymond Loewy Associates, and was rolled by American Steel & Wire.

The USS Embossed Amerstrip was given a No. 4 temper which is especially suitable for formation work. It was rolled to .0239-inch thickness and trimmed to 5⅞-inch width with a No. 3 slit edge. So that the strip would make a good bond with the gold plate it was supplied with a No. 3 finish—the best finish available on strip. It is guaranteed against surface defects and has a sufficiently high lustre to make buffing or polishing before plating unnecessary. To protect the finish and the embossed design, the coils were interleaved with rolls of paper before shipping.

American Steel & Wire specializes in the rolling of special embossed designs for specific applications. If you have a product which could be made more beautiful or more sales-appealing with Embossed Amerstrip, get in touch with American Steel & Wire. Write to 614 Superior Avenue, N.W., Cleveland 13, Ohio. *USS and Amerstrip are registered trademarks*

American Steel & Wire Division of United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
Tennessee Coal and Iron Division, Fairfield, Ala., Southern Distributors
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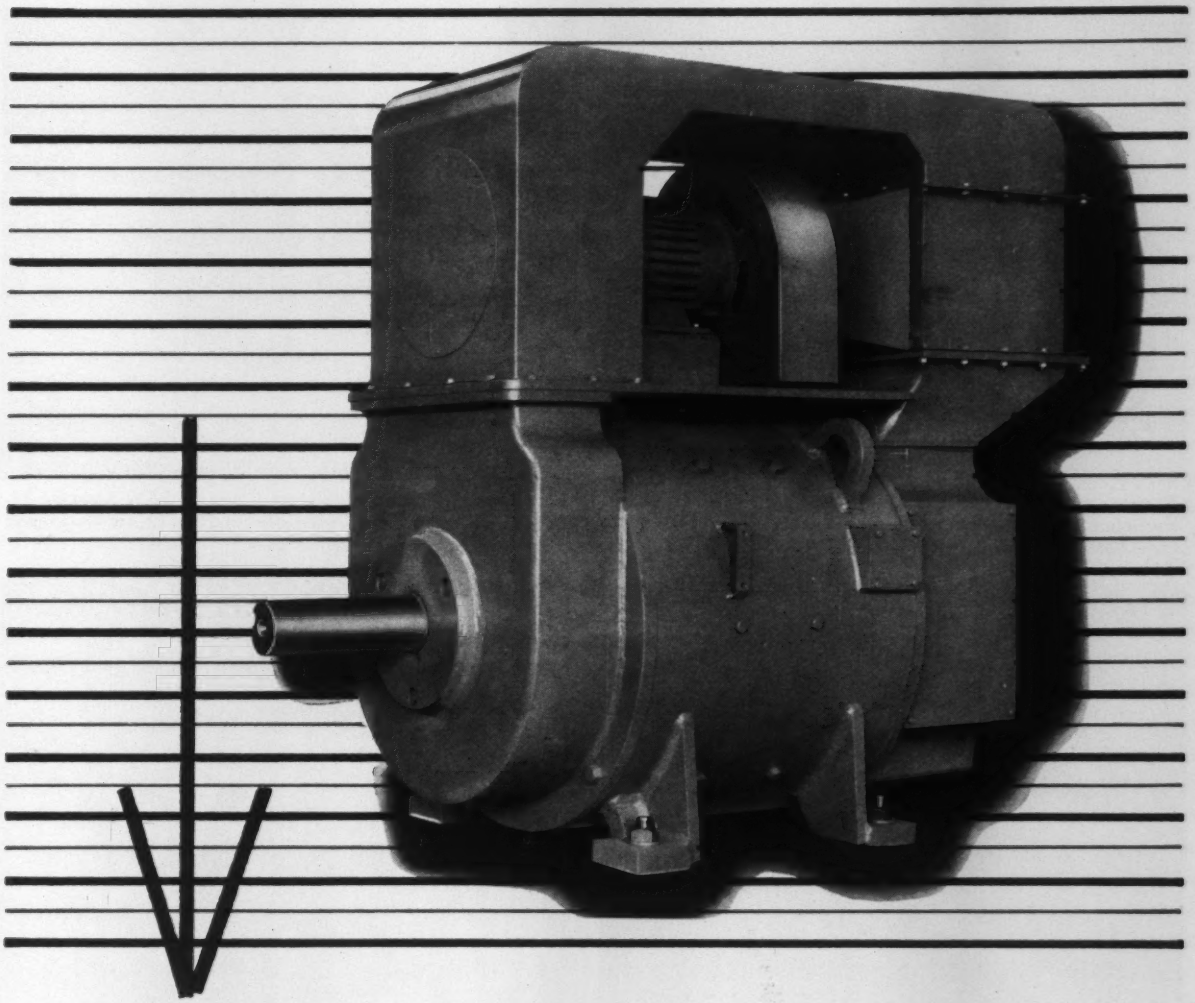

NEW

Totally Enclosed D-c. Motor for LOW SPEED Operating Conditions

Heavy overloads, wide range of operating speeds, dusty atmospheres; that's where the new Super 'T' Dual Cooled Motor stands out. It's an enclosed motor with better-than-open operating characteristics.

An independently powered fan pushes ventilating air through the motor and into a heat exchanger. A second fan blows cooling external air across the heat exchanger tubes. Constant ventilation is maintained without introducing outside air into the motor.

The Super 'T' Dual Cooled Motor will not overheat even at very low operating speeds. The independent fan motor maintains constant ventilation regardless of the Super 'T's operating speed.

Write today for more information on this new totally enclosed d-c. motor. Available 10 thru 200 hp. C-1606

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

RELIANCE ELECTRIC AND ENGINEERING CO.

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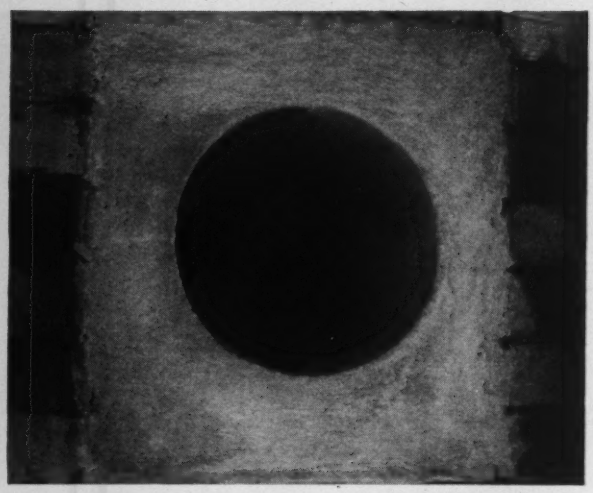
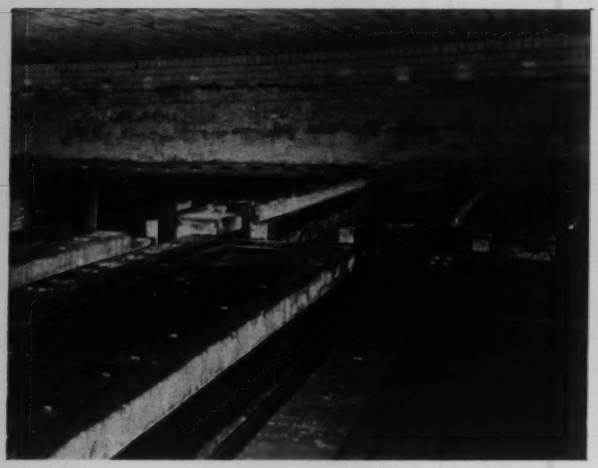
Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.

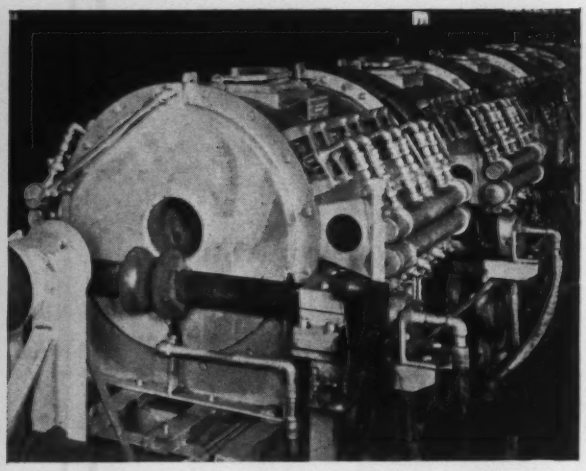
Electrode ports of this electric furnace roof are formed of B&W castable. B&W Kaocast or Kaocrete-32 can be successfully used, depending on severity of service.



High thermal release burner block is cast of B&W Kaocrete-32. Both Kaocrete-32 and Kaocast are used for burner blocks and other services in many other furnaces.



Nose arch of walking beam type furnace for heating forgings is made of Kaocast, B&W's 3000 degree castable. Kaocast is also used in forming complete forging furnaces.



This high speed barrel type heating furnace is typical of many which are completely lined with high temperature B&W Kaocast.

How B&W refractory castables solve high temperature problems

The higher temperatures in industrial processes have called for refractory castables that will stand up in these severe services. B&W offers two extremely durable, high temperature refractory products—Kaocrete-32 for applications up to 3200 F, and Kaocast with a 3000 F use limit. Both have high strength, unusual volume stability and excellent resistance to spalling and slag attack. Investigate B&W *specialized* refractory castables for solutions to your high temperature problems.

B&W Bulletin R-35A gives additional information on versatile B&W refractory castables. Write for copy to The Babcock & Wilcox Company, 161 East 42nd Street, New York 17, N.Y.

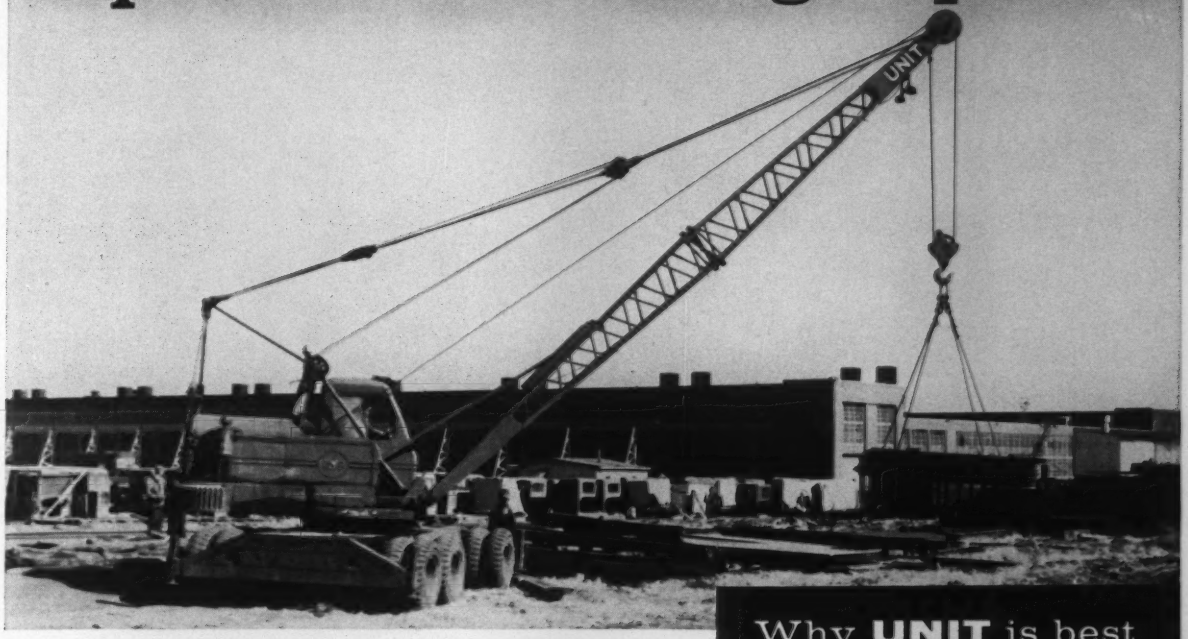
R620R

B&W THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

B&W Firebrick, Insulating Firebrick, and Refractory Castables, Plastics, Ramming Mixes, Mortars, and Ceramic Fiber.

Squeezed for Storage Space?



UNIT MOBILE CRANES

make acres of low-cost outdoor storage space available

You can save valuable *indoor* space for production by utilizing low cost *outdoor* space for storage, as thousands of modern plants are now doing. Outside storage areas cost far, far less to construct and maintain than even the lowest cost new buildings.

Today, most anything can be stored safely outdoors, even in adverse climates, making use of modern protective wrappings, coatings, sprays and techniques, which open up acres of outdoor warehouse space.

Modern UNIT Mobile Cranes, too, make outdoor storage feasible and practical. They travel anywhere, quickly and safely; they give you long reach with big capacity for storing to greater heights; and operate in all weather with dependability, precision, safety and comfort for the operator. And the low maintenance cost of a UNIT makes it an outstanding materials handling machine.

Check your plant today and see if "roofless warehousing" isn't the answer to some of your production bottle-necks. And check UNIT also to see why it offers the most machine for your investment — then call your nearby UNIT Dealer. He'll be happy to survey your operations and suggest the UNIT that's engineered to your needs.

UNIT
CRANE & HOIST CORP.

6517 W. Burnham St.
Milwaukee 19, Wisconsin

Why **UNIT** is best for "roofless warehousing"

- **TIMESAVING MOBILITY** with self-propelled UNIT Mobile Cranes that travel fast — lift high — reach far — extending your "warehouse" limits . . . horizontally and vertically.
- **MORE MANEUVERABILITY** with a short turning radius, full revolving, compact machinery arrangement. Assures low overhead clearance and minimum width.
- **SAFETY CAB**—Full Vision cab provides safe, wide-angle visibility for operator in every direction, brings your "stock-picker" the comfort and efficiency of working indoors.
- **DISC TYPE CLUTCHES** and ventilated, oversize brakes insure smooth, safe, accurate handling of loads without "grabbing".
- **WIDE CHOICE OF MODELS — 11** machines from which to choose . . . including truck and crawler cranes . . . from 10 to 40 ton capacities. Most models are convertible to various front end attachments for greater versatility.

FRASSE ALUMINUM

helps tell how she's doing!

Ballistic missile success hinges on intelligence obtained in test firings. Tracking data – reporting velocity, direction, altitude, temperature, etc. is vital – when processed, it guides critical design changes.

Heart of the intricate data processing system at Cape Canaveral is a Potter Magnityper – a high speed electronic printer that decodes raw material . . . then stores, collates, interprets and prints at 72 *thousand* characters per minute. Lightweight, non-magnetic aluminum is essential to its efficient operation – that's why the Magnityper is made almost completely of Frasse aluminum.

Frasse ships the required sizes quickly from stock – in the grades that contribute to its ease of fabrication *and* performance. For example, Frasse supplies 2024-T4 bars for *strength* and *machinability*, 5052-H34 sheet for *formability* and *weldability* and "775" tooling plate for *dimensional accuracy* with *no distortion when worked.*

Perhaps these same qualities can increase the efficiency of *your* product – or reduce fabricating costs. It's worth investigating – and a Frasse aluminum specialist will be glad to help. There's no obligation – simply write or call your nearest Frasse office. You'll be glad you did.

Call FRASSE for ALUMINUM

Screw Machine Stock • Bars • Rods • Wire Sheets • Plates • Tubing • Holobar Pipe • Fittings • Valves • Extrusions Tool and Jig Plate

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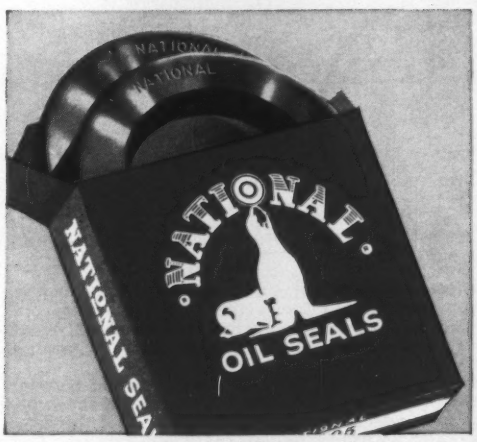
Better products, *faster*, from your Bearing Specialist:

National Oil Seals lengthen bearing life... cut downtime losses... help hold production schedules!



Let your National Seal specialist set up a time-saving, workable service inventory for your plant

National Seals are always available for prompt delivery from stock, or by special order, whenever you need them. In many plants, maintenance men call in their National Seal specialist to set up a working service stock. It speeds repair jobs and gets machines back in operation quickly. It insures immediate replacement of new seals when the old ones are removed. And your National Seal specialist keeps your inventory constant for you.

National Micro-Torc, specially treated leather, and Syntech, synthetic rubber, guarantee uninterrupted protection for all your bearings. Your Bearing Specialist will gladly recommend the proper seal for longer life service. Call him today.

NATIONAL OIL SEALS

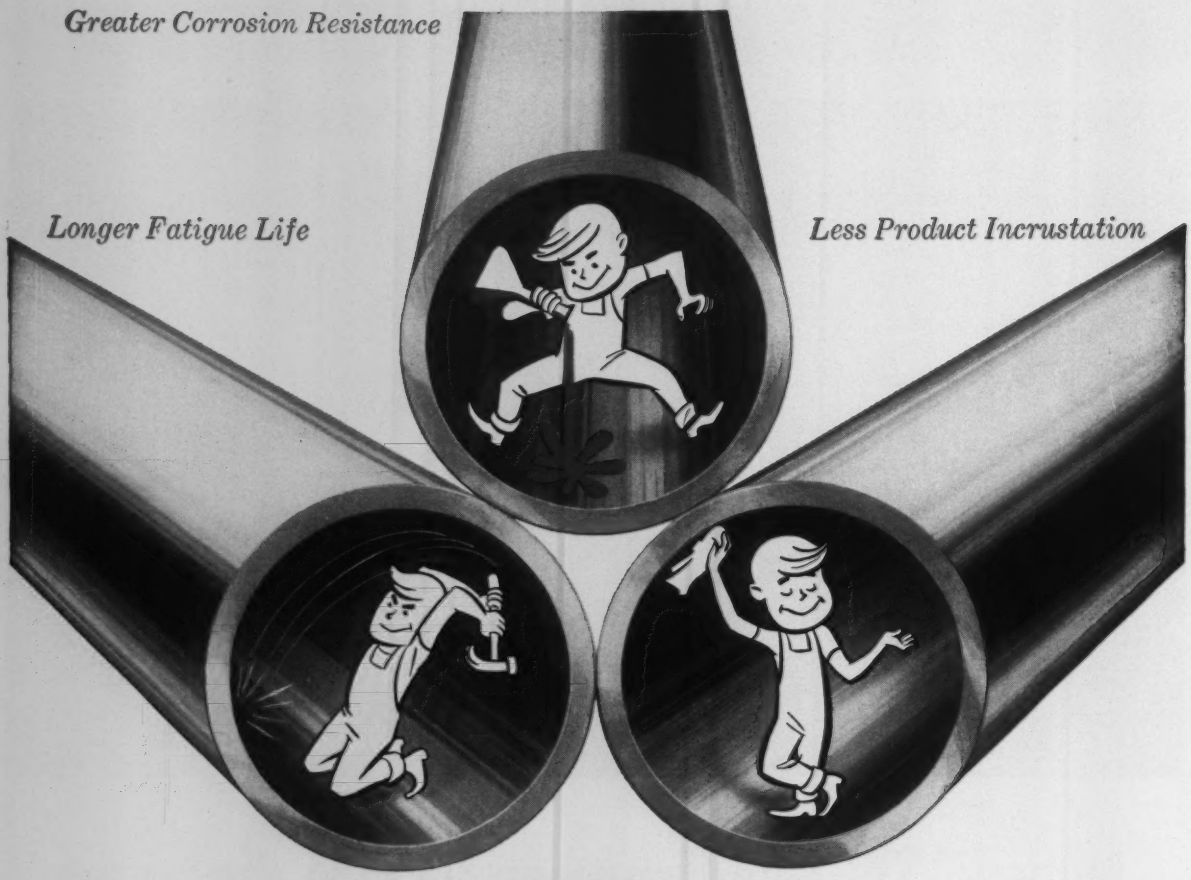
FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN

Greater Corrosion Resistance

Longer Fatigue Life

Less Product Incrustation



new tests prove

CONTOUR-WELDED* STAINLESS TUBING

provides all three!

A recent series of tests prove TRENTWELD® tubing, made by the exclusive *Contour-Weld* process, is smoother than any other full-finished tubing. And still other tests show this extra smoothness ensures longer fatigue life, greater resistance to corrosion and less product incrustation.

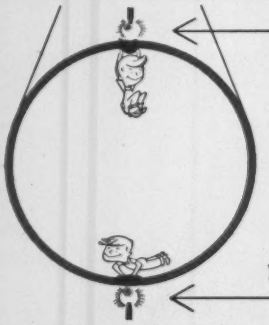
But here's why *Contour-welded* tubing is smoother inside:

First, it's smoother than seamless because it's formed from uniformly rolled strip steel, whereas seamless must be extruded or pierced.

And second, it's smoother than other welded tubing because the Trent-patented *Contour-Weld* process virtually eliminates the weld bead.

But why not get full details on *Contour welded* tubing's superiority? Send for the free 48-page "Trent Weld Manual." It's chock-full of details on *Contour-welded* tubing in sizes from ⅛" to 40" — in stainless and high alloy steels, titanium, zirconium, zircaloy and Hastelloy†. Write: Trent Tube Company, Box 2518, Pittsburgh, Pa.

†Trademark Haynes Stellite Co.



In Conventional Welding

With Contour Welding

In **CONVENTIONAL WELDING** of tubes, gravity pulls molten metal down to form a bead that is difficult to remove by cold working. And cold working may lead to undercuts, focal points for fatigue cracks and corrosive attacks. Cleaning becomes difficult.

*With **CONTOUR WELDING** the tube is welded at the bottom. Gravity still pulls the molten metal down inside the tube, but now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam more closely conforms to the contour of the tubing.

CONTOUR TRENTWELD®

stainless and high alloy pipe and tubing

TRENT TUBE COMPANY

Subsidiary of Crucible Steel Company of America • GENERAL OFFICES: East Troy, Wisc. • MILLS: East Troy, Wisc.; Fullerton, Calif.

Another example of National Roll quality control

"Easy" Esary, left, National sales representative and Larry Weaver, iron foundry supervisor, discuss a double-pour operation at National's Avonmore plant.

Double-pouring gives longer roll life

Double-pouring is a foundry technique in which a special, high hardness iron is poured first and allowed to form the outer roll shell; then a low alloy cast iron is poured, displacing the still-molten special composition iron to form a shock-resistant roll core and more easily machined necks.

Apart from the interesting, precise foundry procedures, double-poured National NN Nickel Iron Rolls have real advantages to roll users—high surface hardness needed for certain applications, plus a tough, resilient core that stands up in hard service.

National Roll's only business is rolls; steel, iron and nodular iron. That's why we have developed a team of metallurgy and production experts that is outstanding for its experience and the service it can render to roll users.

Much of the National story is told in a new brochure that soon will be off the press. Write for a copy. It helps explain why . . .

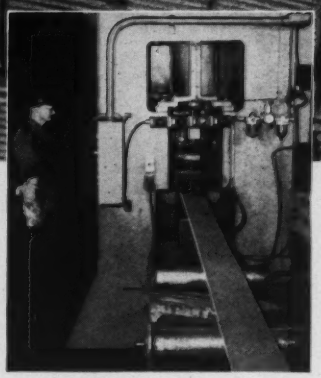
National's the growing name in rolls

NATIONAL ROLL & FOUNDRY DIVISION

GENERAL STEEL CASTINGS CORPORATION, Avonmore (Westmoreland County), Pa.

General Steel Castings Corporation, General Offices: Granite City, Illinois • Plants: Granite City, Ill., Eddystone, Pa., Avonmore, Pa.

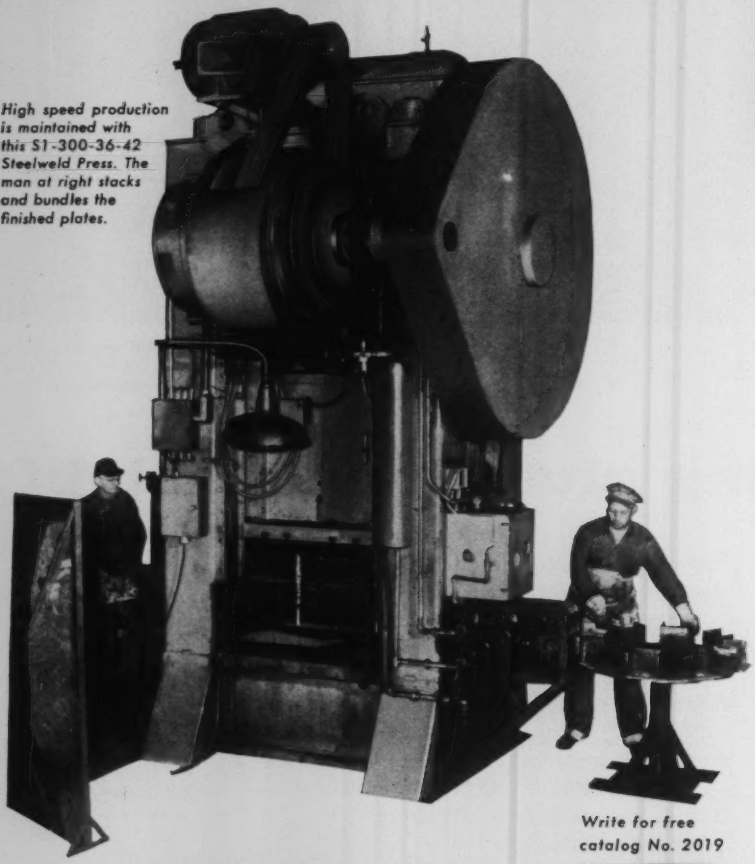
STEELWELD SINGLE POINT PRESS produces 400,000 mine plates monthly



These bundles of finished "West Virginia" brand mine roof bolt washer plates represent little more than an hour's production on the Steelweld Press.

Long strips of steel feed through from side of machine automatically.

High speed production is maintained with this S1-300-36-42 Steelweld Press. The man at right stacks and bundles the finished plates.



A single-point straight-side 300-ton Steelweld Press at the West Virginia Works of Connors Steel Division, H. K. Porter Company, Inc., Huntington, West Virginia, is used exclusively for the production of one item—"West Virginia" brand mine roof bolt washer plates. With an operating speed of 40 strokes per minute, very little time is lost with this machine.

Strips of flat steel are fed into one side of the press, and the completed washer plate parts come out of the other. Movement of the steel through the machine and punching are done automatically.

"West Virginia" brand mine roof bolt washer plates are produced in 3—4—6 and 8 inch squares and thicknesses of ¼ and 5/16-inch. A hole is provided in the center with a saucer-like elevation around it. A second smaller hole is punched simultaneously about midway between the center bolt hole and one corner for insertion of a "Sky Hook" or roof bolt suspension arm.

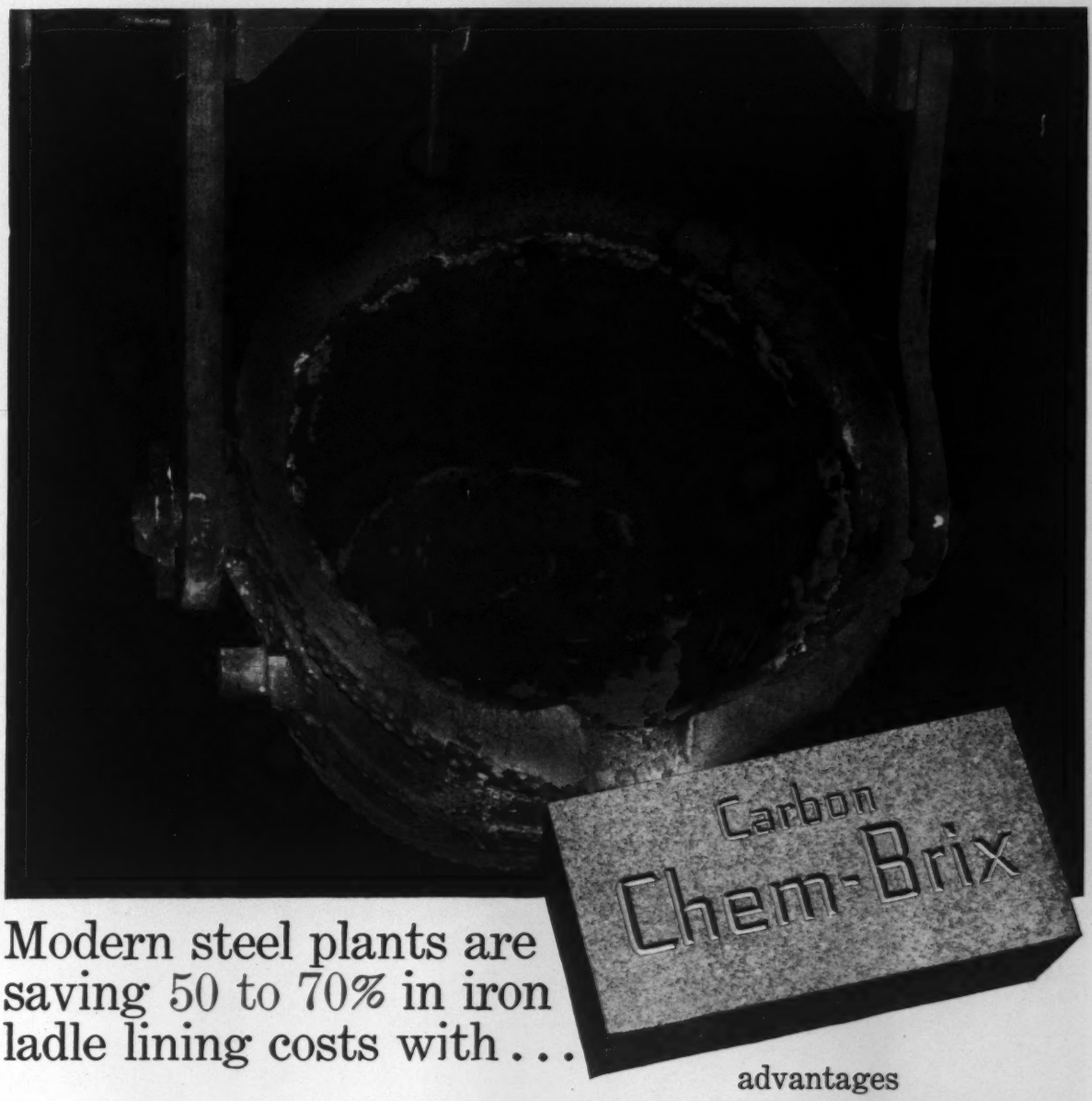
Steelweld Presses have many outstanding features to offer, as Connors Steel Division and other leading users in automotive, agricultural equipment, heavy fabricating and other industries have learned. Our sales engineers will be glad to give you the details.

Write for free catalog No. 2019

STEELWELD
STRAIGHT-SIDE PRESSES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

STEELWELD MACHINERY DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4802 E. 280 ST. • WICKLIFFE, OHIO



Modern steel plants are saving 50 to 70% in iron ladle lining costs with . . .

Carbon CHEM-BRIX, after six years of service in steel plants, have gained the recognition as the most efficient and economical refractory for lining transfer and bessemer steel ladles, hot metal spouts, etc. Service comparison tests prove that CHEM-BRIX actually cost 50 to 75% less than regular fire clay brick. CHEM-BRIX provide you with a brick that offers 100% dimensional uniformity; provides a smooth, monolithic surface; "sheds" molten metal like oil sheds water; offers a unique self-cleaning property and simplifies skulling. Write today for complete information.

advantages

- **Last 50 to 75% longer than fire clay brick.**
- **Produces a monolithic, self-cleaning surface.**
- **Simplifies skulling.**
- **100% size uniformity insures tight joints.**

ILLINOIS CLAY PRODUCTS CO.

Main Office—Barber Building, Joliet, Illinois
Sales Office—208 South LaSalle Street, Chicago 4, Illinois

MANUFACTURERS OF: GOOSE LAKE Ladle Brick, Ground Fire Clay, Fire Clay Flour; GRUNDITE Bond Clay; FIROX; THERM-O-FLAKE Insulation Coating, Brick, L.B. Block, Concrete; CHEM-BRIX, Silica, Carbon

Predictable Performance

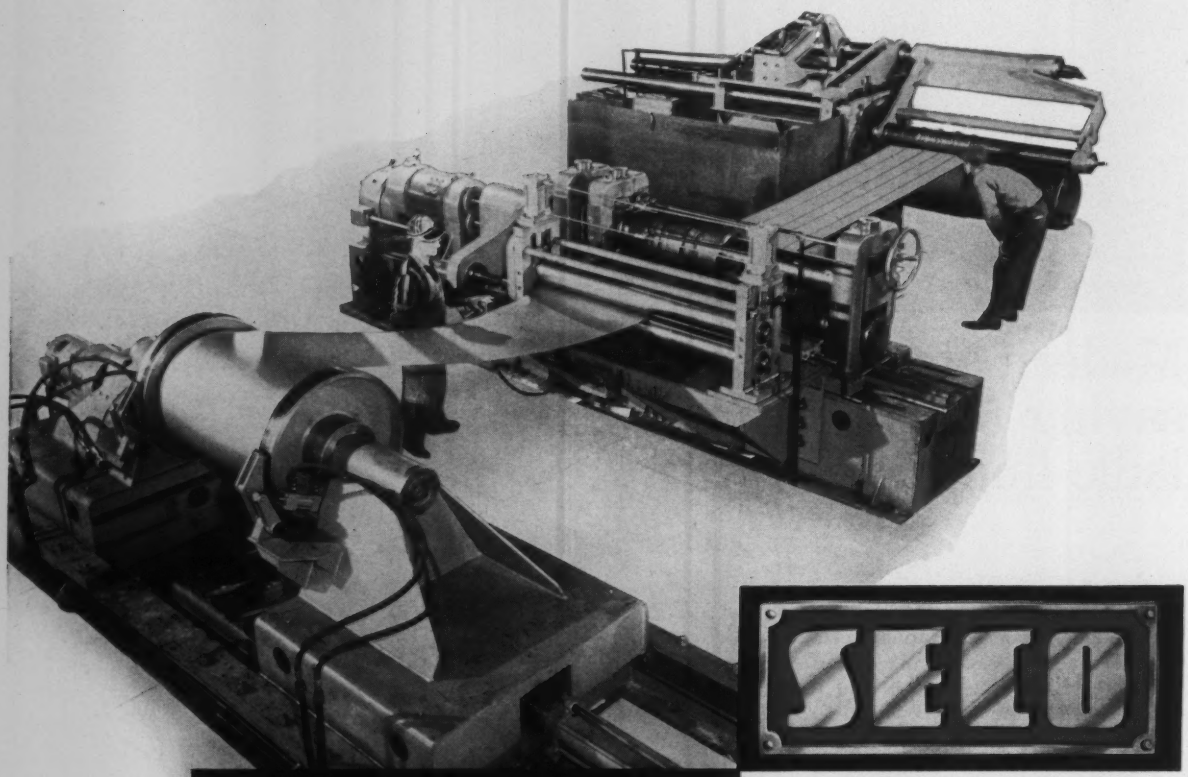
...is assured Detroit Steel Corporation with the installation of a

Availing themselves of SECO's facilities for custom building efficient slitting lines, the Detroit Steel Corporation, Detroit, Michigan, just recently installed this 60" Seco Slitting Line thereby assuring predictable performance. The entire unit, consisting of a cone-type Uncoiler, Slitter and Recoiler, was specifically designed and built by SECO for this customer.

Whatever your present requirements may be, call upon SECO's staff of trained sales engineers to assist you in planning for the present as well as your 'future' capacity.

SECO 60" SLITTING LINE

Seco builds a complete range of slitting lines available from 12" to maximum strip widths.



STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION
CLEVELAND 22, OHIO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

Affiliated with Lee Wilson Engineering Co., Inc.

You Can
SEE
The Difference

You Can
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The Difference
AT NO EXTRA
COST

Why Cleaner, Brighter LUSTERIZED® Bars Handle Easier and Work Better

If you haven't made a comparison run against ordinary cold finished steel bars with clear, bright Bliss & Laughlin Lusterized Finish bars, you will be impressed with the difference.

Lusterized bars start out cleaner, are less messy to handle, remain clean and bright during storage and production. The absence of processing grit, oil and lime keeps chucking mechanisms on automatics free from clogging and production flowing steadily at a profitable pace. The bright, clean surface often requires no finishing operation, reduces the need for elaborate pre-plating preparation.

Lusterized Finish is a Bliss & Laughlin exclusive. It is another result of a constant research program over nearly 70 years to produce cold finished steel bars that will improve your production and profits. Ask for a new folder detailing the production advantages of specifying Bliss & Laughlin Lusterized bars.

LUSTERIZED FINISH is the STANDARD FINISH at Bliss & Laughlin

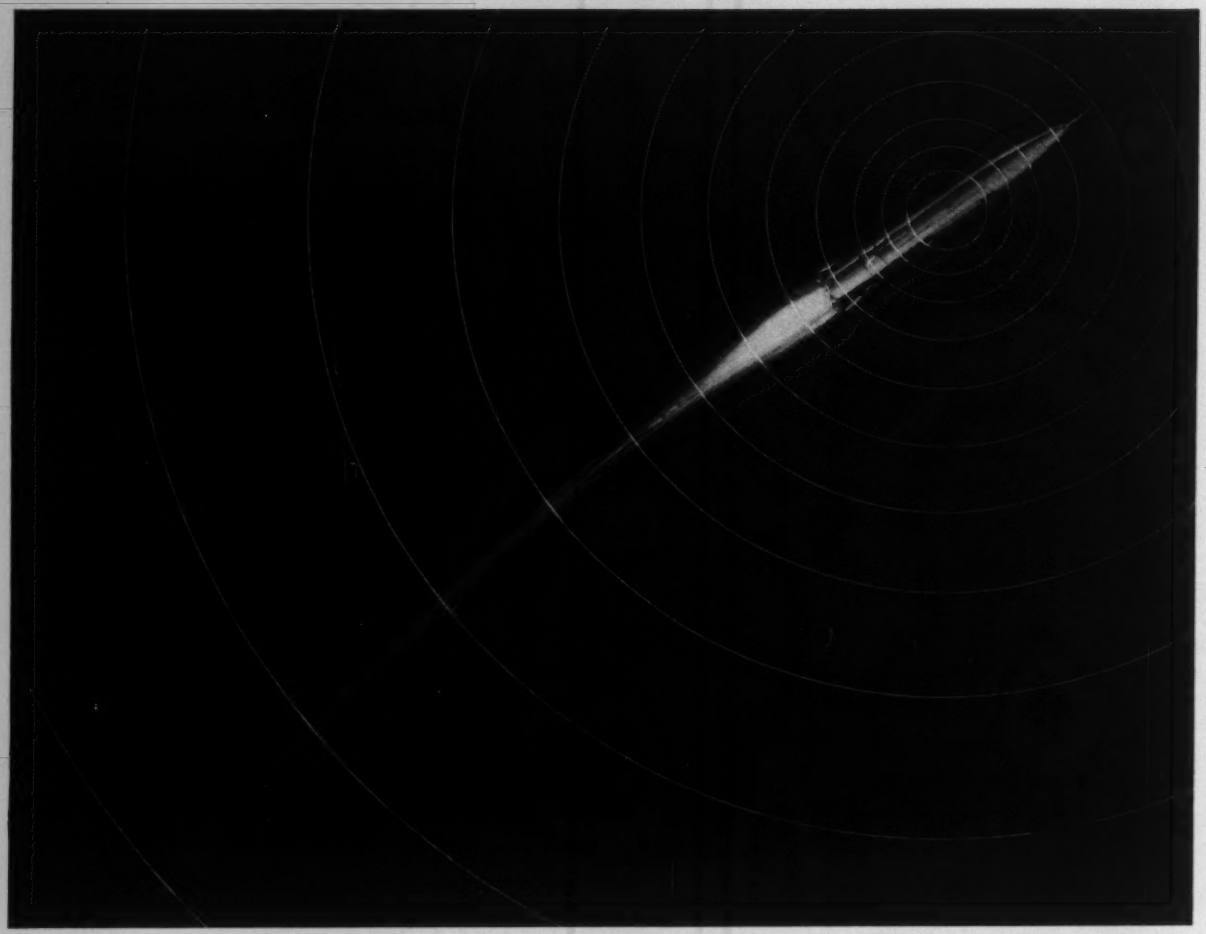
Specialists in Finish, Accuracy, Straightness, Strength and Machinability

BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • PLANTS: Harvey, Detroit, Buffalo, Mansfield, Mass.

B+L

Largest Independent Producer of Cold Finished Steel Bars



Things happen fast to a rocketing missile. High-nickel Mumetal shields help tape recorders get it all down accurately.

How Nickel helps record messages from space

When a missile rockets off into space, it detects all sorts of data – temperature, radiation, meteoric dust – the many things we need to know in order to conquer space.

Since radio transmission and reception between missile and ground is not always reliable, some missiles carry an airborne secretary–a multichanneled tape recorder.

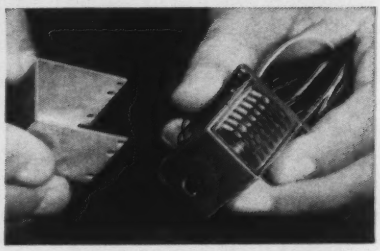
It records as many as thirty different bands of data side by side on a 1½-inch magnetic tape.

Confusion of all the magnetic fields crammed inside the tiny head could cause messages to come out garbled.

But there is a way to keep them straightened out–by using Mumetal* (77% Nickel). This alloy has the unusual ability of soaking up magnetic fields like a sponge. Thin, flat shields of Mumetal siphon off troublesome interference.

The manufacturer also covers the whole head with more Mumetal to bar stray magnetic fields on the outside from getting inside. And then a protective Nickel-chrome plating goes on top of that.

All in all, it's quite a job Nickel does. And something to keep in mind the next time you're faced with a problem in your product or process. If it has to do with high or low temperatures . . . magnetism . . . corrosion . . . fatigue or some other factor, write us. We'd be happy to show you how Nickel, or one of its alloys, may be able to help.



Tiny magnetic head of tape recorder has Mumetal shields to trap magnetic interference, help Davies Lab. Division of Minneapolis-Honeywell pack much in little space. Nickel-chrome plating on cover adds durability, corrosion resistance, and attractive appearance.

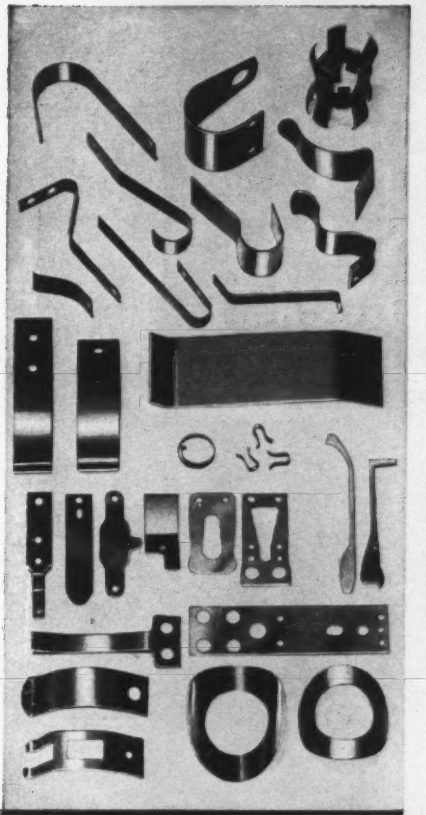
*Trademark, Allegheny Ludlum Steel Corporation

The International Nickel Company, Inc.

67 Wall Street INCO New York 5, N.Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER



SANDVIK
SPRING STEEL QUALITY

Earns Its Pay By PRECISE PERFORMANCE

Where performance is important, Sandvik spring steel quality is well worth its price. Many spring steel users have found that Sandvik delivers the *exact* performance they want under their tools and in their products.

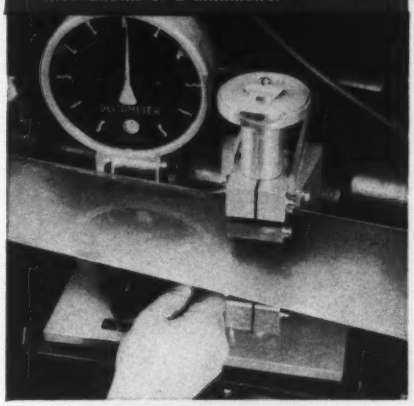
Sandvik's purity, small lot processing and painstaking quality control assures your money's worth in consistent quality performance.

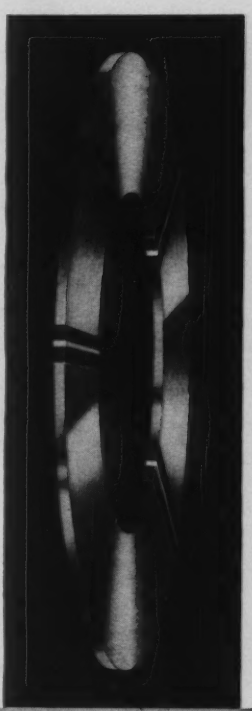
In addition to the wide variety of qualities and sizes carried in stock, Sandvik has local facilities for custom-processing and finishing to your requirements.

For specific physical properties plus accurate flatness, straightness, width, gauge and edge finish, specify a Sandvik spring steel.

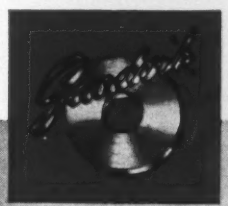
Send for free brochure on various Sandvik cold rolled and hardened and tempered strip steels.

Strip thickness is checked during rolling and at final inspection with a "Deltameter", an instrument developed at Sandviken for measuring variations of thousandths of a millimetre.





SANDVIK STEEL, INC.



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SS-200

Riverside continuous casting saves you production time, cuts rejects

Phosphor Bronze and other copper-base strip, rod, and wire from Riverside produces consistently better end products for you—free of weak points that result in rejected pieces or whole batches.

How do we do it? By continuous casting, a special Riverside-Alloy process—a process that eliminates air holes and impurities, leaving a dense, homogeneous casting for better wire-drawing and other fabrication requirements.

Get the full cost-saving story from Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, New Jersey.

good riddance to "Swiss Cheese" castings!

RIVERSIDE-ALLOY METAL DIVISION

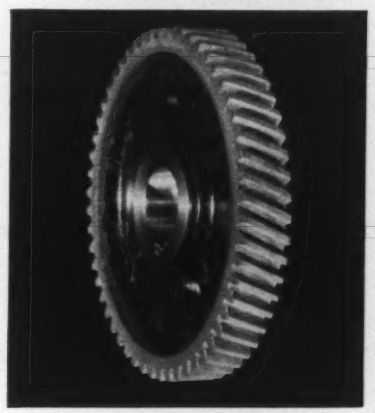
PORTER ***H.K. PORTER COMPANY, INC.***

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; PEERLESS ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S. A.; and in Canada, Refractories, "Disston" Tools "Federal" Wires and Cables "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

PROGRESS IN PLASTICS

CDF CELORON GEARS ARE QUIET, WEAR LONGER

Why plastics for gears? Because laminated-rim molded Celoron® gears are *quiet* (eliminate the annoying noise of chain timing and metal-to-metal gearing). Because they reduce heat and wear on mating metal gears, thereby reducing repair costs and preserving accuracy throughout the life of the engine.



Strength. Stamina is built into every CDF Celoron gear. Stronger teeth, longer running life, and smoother performance are characteristics of the Celoron gear. No type of "cheaper" gear construction has yet proved as satisfactory.

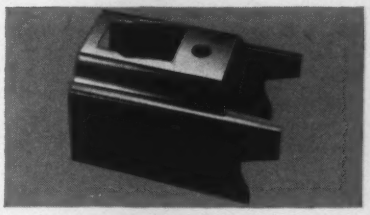
What it is. Each CDF Celoron gear blank is molded of laminated and macerated cotton cloth impregnated with a special phenolic resin. Gear teeth are cut in the laminated rim. Repeated tests prove the high impact strength, the great wear-resistance, and the low tone frequency of this "silent" gear material.

Design and purchasing men interested in adapting Celoron gears for engine-timing and other needs may obtain full technical data (properties, horsepower ratings, etc.) by writing to the Celoron Division of CDF at Bridgeport, Pennsylvania.

COMPLICATED PLASTICS PARTS AT LOW COST THROUGH POSTFORMING CDF DILECTO

How it's done. Briefly, postforming is effected by heating a special grade of CDF Dilecto® laminated plastics until it's pliable, and then forming it in an unheated, inexpensive mold.

Less expensive. When you postform Dilecto parts, you generally save money all around: Lower die costs (often wood or plastics is entirely satisfactory); lower retooling costs to meet new specifications; lower labor costs—these are a few of the savings made possible through postforming of Dilecto.



Why Dilecto? Where you need high strength-to-weight ratio, superior electrical and chemical properties, light weight, easy machinability, and excellent resistance to abrasion, weathering, and moisture—CDF Dilecto laminated plastics give you the best combination. CDF delivers either the Dilecto stock or the completely fabricated parts as specified.

Special Dilecto grades. For better response to severe bends and deep draws, and for the ability to take the most involved forming without fracturing, choose one of the special postforming grades of Dilecto, described in CDF Technical Bulletins 11,110 and 11,140. Most of the standard Dilecto grades, though, can be postformed to some degree.

SMALL ELECTRICAL PARTS BY THE MILLIONS

CDF specializes in the complete fabrication of plastics and fibre components for automotive and aircraft use. These breaker-arm bushings were made from

Dilecto tubing on automatic screw machines, by men who know best how to cut costs in working laminated plastics. Investigate CDF's extensive fabricating facilities—let CDF do the whole job, and assure your own production deadlines.

NEW CDF LITERATURE • *For Bulletins referred to in this advertisement, or for recommendations relating to your current problem in electrical insulation, send this coupon.*

Please send the following Technical Bulletin(s):

☐ Celoron Molded Gears, Bulletin C-58

☐ Dilecto Postforming Grades, Bulletins 11,110 and 11,140

☐ Please have a CDF representative call to discuss my electrical-insulation problems in detail.

Name_____ Title_____

Company_____

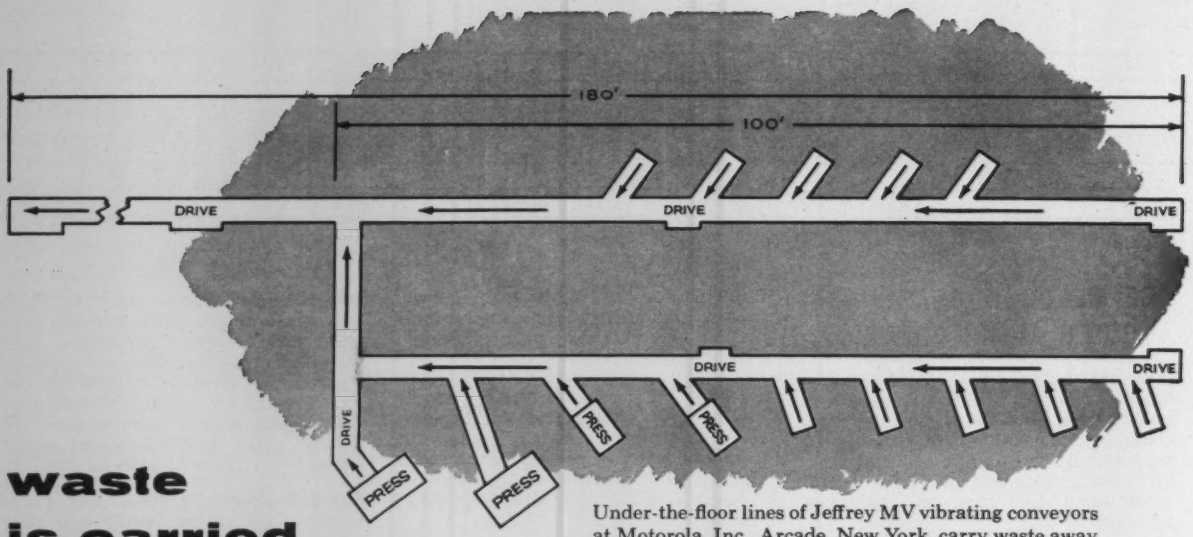
Street Address_____

City_____ Zone____ State_____

CONTINENTAL-DIAMOND FIBRE

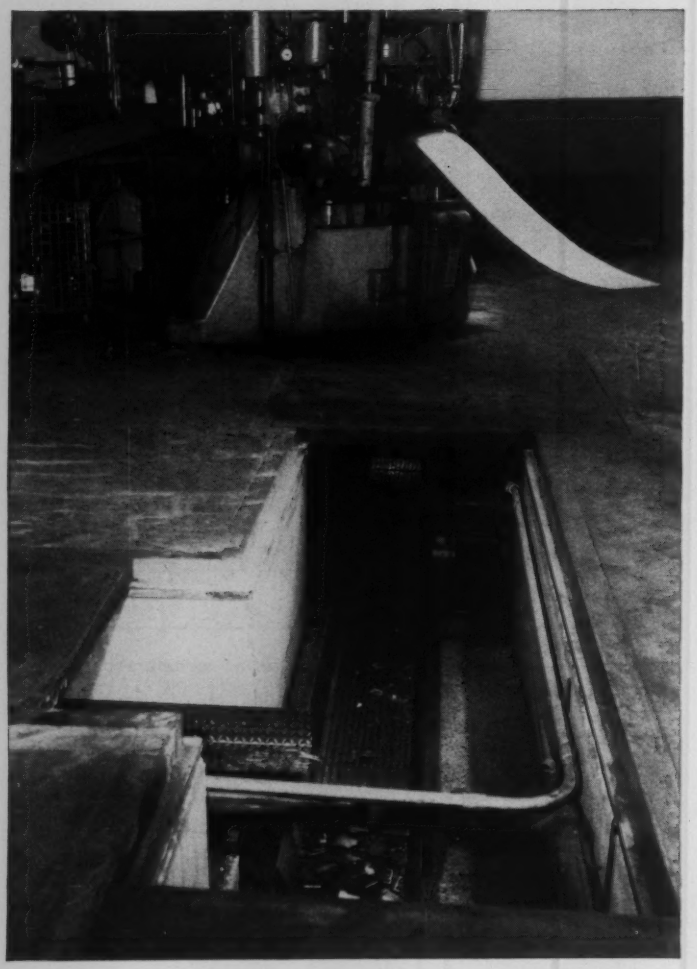
A SUBSIDIARY OF THE Bendix COMPANY • NEWARK 85, DEL.

In Canada: Continental-Diamond Fibre of Canada Ltd., 46 Hollinger Road, Toronto 16, Ont.



Under-the-floor lines of Jeffrey MV vibrating conveyors at Motorola, Inc., Arcade, New York, carry waste away from the punch presses as fast as it is produced. Engineered by Conveyor Systems, Inc. of Chicago.

waste is carried along smoothly, quietly on the JEFFREY MV CONVEYORS



MOTOROLA's punch press department, with its fourteen busy presses, is kept neat at all times. Metal trimmings and punchings from the presses fall directly through chutes onto Jeffrey vibrating conveyors below the floor. These keep this waste moving toward the end of the building, where a bucket elevator lifts it to an overhead bin, to be hauled away.

Jeffrey MV conveyors move material *fast*, lifting it from the deck with a rapid forward motion; no sliding action to cause wear. They are simple in design, dependable in operation and rugged in construction, so they're economical to operate and low on upkeep.

Bulletins describing Jeffrey mechanical conveyors of all capacities—light, medium and heavy—are available. For copies, write The Jeffrey Manufacturing Company, 925 North Fourth St., Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT . . . TRANSMISSION MACHINERY . . . CONTRACT MANUFACTURING

JONES & LAUGHLIN STEEL WAREHOUSE DIVISION

The Department Store of Steel

J & L Steel Service Centers—efficient and dependable. Anywhere you look—from the order department to the shipping floor, from storage to processing equipment like this friction saw—you'll find something new, something better at The Department Store of Steel. Unparalleled expansion, new buildings, the latest machinery and equipment, increased stocks of steel, stainless and aluminum, and skilled warehousemen trained to give *extra* care to every order—all add up to faster, more efficient service for J & L customers.

Take advantage of the streamlined, time-saver service J & L offers. Count on The Department Store of Steel. You'll get exactly what you want—when you want it.

J & L Steel Warehouse Division

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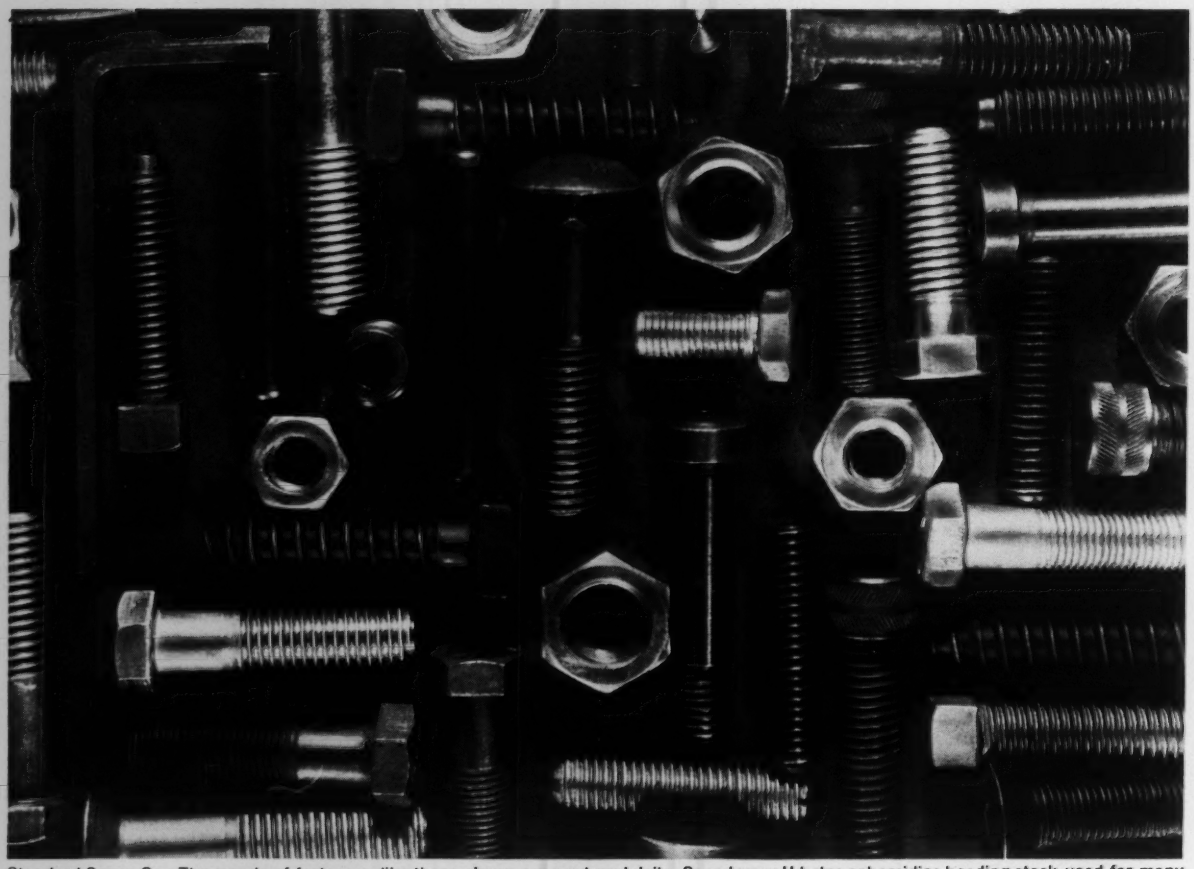
HAMMOND • INDIANAPOLIS • LANCASTER • LOUISVILLE • MEMPHIS
NASHVILLE • NEW ORLEANS • NEW YORK • PITTSBURGH



Standard Screw Co.: Thousands of fasteners, like those above, are produced daily. Speedomax H helps spheroidize heading stock used for many of these Stanscrew fasteners.

Reproducing annealing temperatures a problem?

Not for Standard Screw Co. at its Chicago Screw Co. Div., Bellwood, Ill., where Speedomax® H is helping to spheroidize 60 tons of coil a day for later production into Stanscrew fasteners. As part of their modernization and expansion program, Standard Screw recently installed one of the fastener industry's first continuous, pusher-type Surface Combustion furnaces . . . equipped it with Speedomax H controllers. After more than a year of operation, Speedomax H is reliably maintaining the selected time-temperature program . . . helping to reproduce again and again 85% spheroidization of pearlite in the structure of SAE-1038, 1041 and several low-alloy steels. Rugged and compact, this modern controller is providing equally dependable control for many other heat treating processes . . . helping to produce both process economies and a quality product. *Whatever your heat treat, it'll pay you to investigate Speedomax H!* For details, contact your nearest L&N office, or write 4956 Stenton Ave., Phila. 44, Pa.

Six Speedomax H controllers regulate temperature of six furnace zones, reliably reproducing process temperatures 24 hours a day, 5 days a week.

LEEDS Instruments **NORTHRUP** Automatic Controls • Furnaces

single stand reversing plate mill

BLAW-KNOX
PLATE MILLS

Blaw-Knox designs and builds a full range of continuous or single stand reversing plate mills for rolling ferrous and non-ferrous slabs. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company. Foundry and Mill Machinery Division. Blaw-Knox Building, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building · 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

IT PAYS TO STANDARDIZE ON **STANSCREW**

Stanscrew fasteners add to reliability of SPEED QUEEN appliances

Speed Queen laundry appliances are built to take a beating. In these automatic washers and dryers, components are necessarily subjected to vibration, heat, moisture, and customer abuse . . . must withstand punishment year after year if Speed Queen's outstanding reputation for quality is to be upheld.

For example, consider the socket set screw being inserted on the motor pulley above. Should this loosen, the customer would have to pay for a service call . . . and Speed Queen would have to pay in consumer dissatisfaction. Therefore, to maintain rigid quality standards, Speed Queen has chosen Stanscrew fasteners for this and other demanding applications.

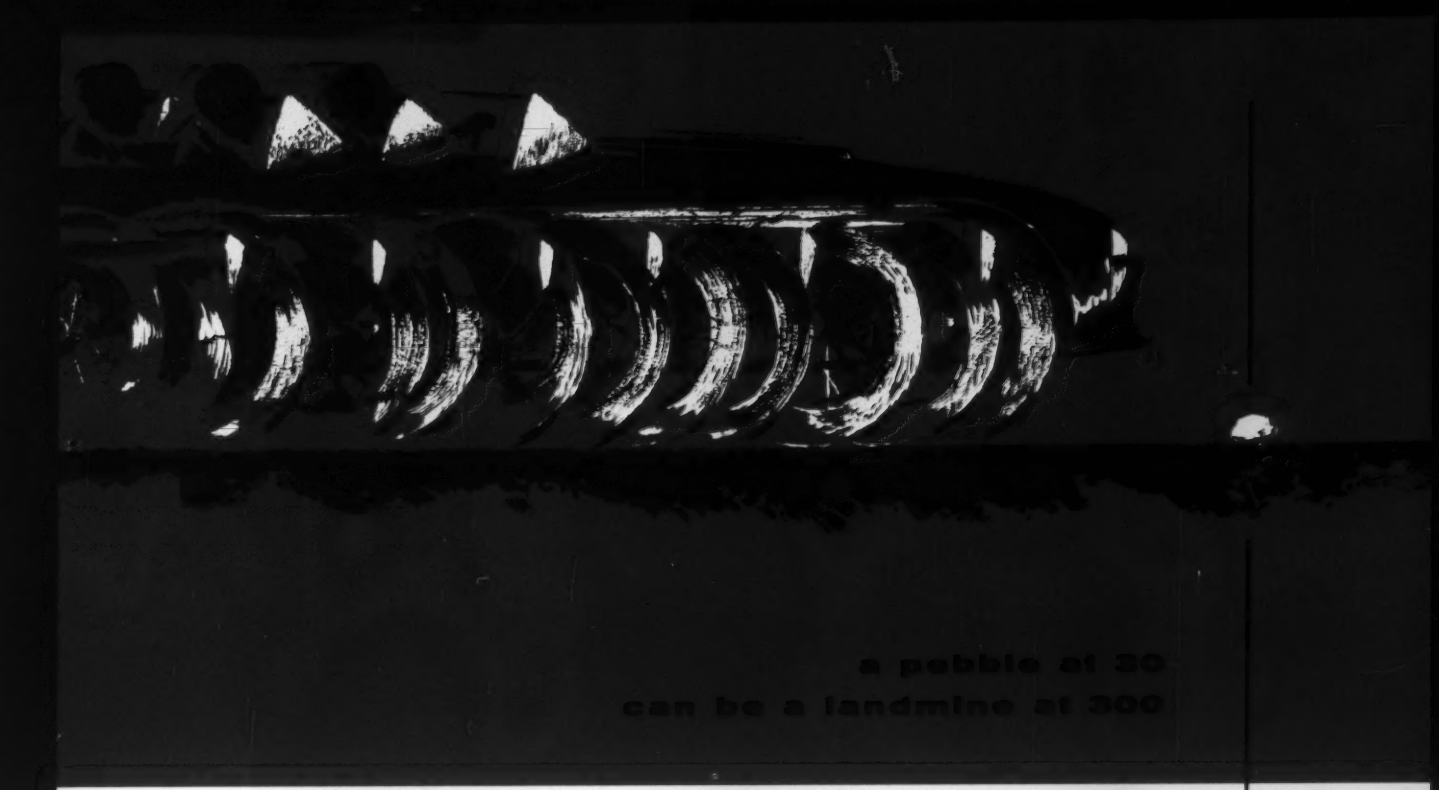
Despite their high standards of quality, Stanscrew fasteners are economically priced. And they are offered in a comprehensive selection of over 5,500 different types and sizes to meet the overwhelming majority of all fastener requirements. All 5,500 are quickly available through your local Stanscrew distributor.

Call your Stanscrew distributor today. He will arrange a visit from a Stanscrew fastener specialist who can often suggest ways to cut assembly or fastener costs . . . for example by substituting an inexpensive standard fastener for a costly special.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois



a pebble at 30
can be a landmine at 300

the harder you drive for
super speed production
the more you need safe-
guards offered you in...

brass

copper

aluminum

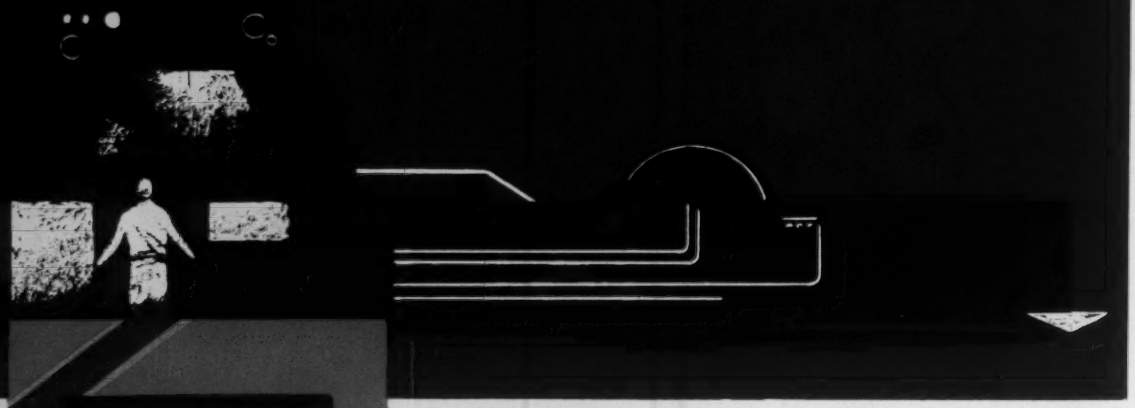
MILL PRODUCTS

MADE IN USA

. . . and made better to bring out the ***BEST*** *in your products*

Scovill Manufacturing Company, Mill Products Division, 99 Mill St., Waterbury 20, Conn. Phone PLaza 4-1171

3SC60



SCOVILL®

features
to help you take
full advantage
of today's
high speed
methods and
machines

Metal soundness and uniformity — For more than 20 years, unique Scovill *continuous casting* machines have been supplying a major part of the cast brass bars and billets used to produce strip, sheet, rod, wire and tube . . . over two billion pounds of metal that is inherently sounder and more uniform in every respect. This means fast running capability, minimum down-time and rejects, better quality products.

Close-tolerance specifications — Modern high-speed fabricating equipment is increasingly intolerant of what once were considered minor variations in grain size, temper, dimensions, surface finish. Scovill advanced engineering and quality-control procedures, working with new close-tolerance production equipment, meet or exceed the demands of highest-speed fabrication.

Selection of the right alloys — Scovill Metals Research maintains a continuing program of research into the practical needs of mill products fabricators. Scovill's broad range of alloys permits recommendation of exactly the right properties and qualities for a given job.

The industry's most advanced packaging — Packaging of Scovill Brass, Copper and Aluminum Mill Products can make a specific contribution to speed and efficiency in your operations . . . save you handling time and space in storage . . . cut production down-time and start-up. Scovill innovations include extra-long-run coils; Fast-Feed wire packages; easy-to-handle bundling or boxing of rod and tube.

Any fabricator who has made Scovill a part of his competitive team knows that these are only a few examples of the down-to-earth help and service he can depend upon. Call in Scovill NOW . . . especially if you want to get ideas and help in selection of the BEST metal for an important new product.

SCOVILL MANUFACTURING COMPANY
Mill Products Division, 99 Mill St., Waterbury 20, Conn., Phone Plaza 4-1171

MILL PRODUCTS

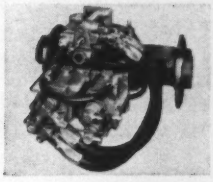
MADE IN USA

. . . and made better to bring out the ***BEST*** *in your products*

4SC60

PLANNED MASS-HANDLING

Your immediate attack against rising costs



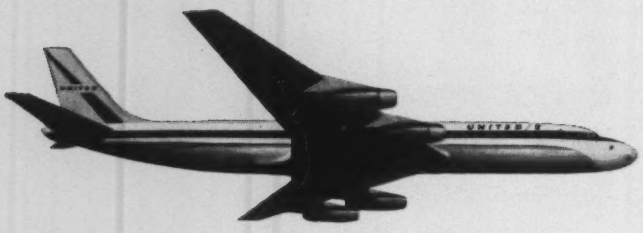
IT'S A FACT: The unique Towmotor Towmostatic Drive guarantees handling flexibility, smooth operation and maintenance benefits far greater than any other fork truck drive.

YOUR SHORTCUT TO EXTRA PROFIT is through planned mass-handling that puts the right product in the right place at the right time. Integrating TOWMOTOR fork lift trucks into your production operation is the fastest way to lower costs and increase profits. Write for case studies that show you how similar companies are reducing costs through more effective handling operations. TOWMOTOR CORPORATION, CLEVELAND 10, OHIO.

FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

TOWMOTOR
THE ONE-MAN-GANG®
-GERLINGER

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation



EXCLUSIVE ON UNITED AIR LINES

RAF/JET FREIGHT

Reserved Air Freight. RAF®/Jet Freight lets you reserve space aboard a United Air Lines DC-8 Jet Mainliner® and assures you that all shipments get where you want them, on time. Just call United and definite space will be reserved for your shipment, on either a one-time or a recurring basis.

Expanding service. RAF/Jet Freight is now available to or from **New York, Washington-Baltimore, Philadelphia, Chicago, Denver, Los Angeles, San Francisco, Seattle-Tacoma, and Portland, Ore.**

Best of the jets—for shipping, too. United Air Lines DC-8 Jet Mainliners are equipped with the finest temperature control in any aircraft and are serviced on the ground with completely new jet-age handling equipment that gives your shipments faster, yet more careful handling.

Learn how growing RAF/Jet Freight service can help you. Call any United sales office or write to United Air Lines, Cargo Sales Division, 36 S. Wabash Ave., Chicago 3, Ill.

Fly United and ship United
for extra care on the best of the jets

UNITED AIR LINES DC-8
JET MAINLINER, BY DOUGLAS

Modern board forging hammer

DEPENDABILITY of shifter fork improved by designing it to be FORGED

By designing the shifter fork of his transmission to be forged, a manufacturer of earthmovers eliminated costly equipment breakdowns in the field because of fork failure. Factor of safety was *in*creased even while weight and over-all costs were being *de*creased.

Parts scrapped because of voids uncovered after much high-cost machining are eliminated . . . forgings are *naturally* sound all the way through. Forgings start as *better* metal . . . are further *improved* by the compacting hammer-blows or high-pressure of the forging process.

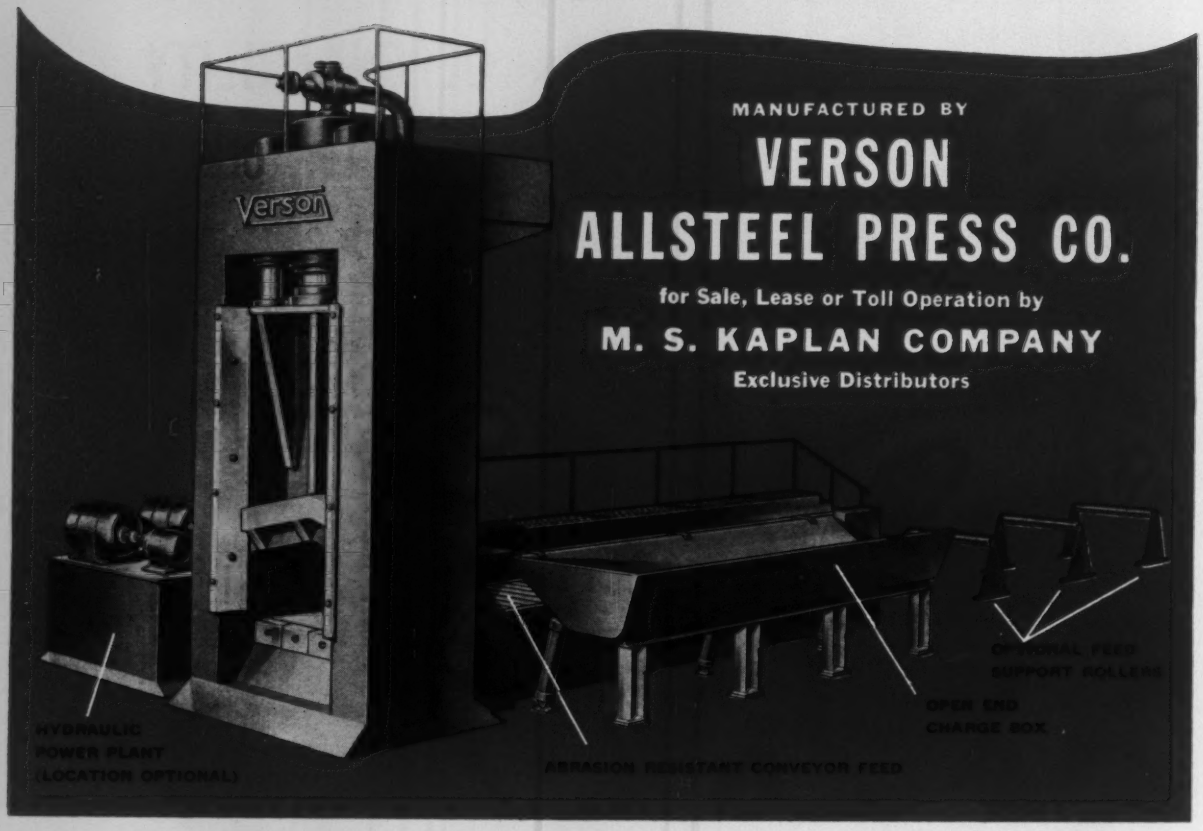
Design your parts to be forged . . . increase strength/weight ratio, reduce as-assembled cost, improve performance. Literature to help you design, specify, and procure forged parts is available on request.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine

New 1200 Ton Hydraulic Scrap Shear with Cost-Saving Continuous Feed



Cuts Rejects and Bulky Scrap of any Length Without Torching

The revolutionary new conveyor feed and extra large capacity make this hydraulic guillotine scrap shear far superior to any on the market. Built to specifications of M. S. Kaplan Company, by Verson Allsteel Press Company, Chicago and Dallas, this machine is a real time-saver . . . money-maker.

The charging box is of open end construction and the shear is fed by a rugged continuous conveyor. No time is lost waiting for a pusher ram to return to the starting position. Without interruption, the machine flattens the scrap, and cuts to lengths in multiples of 6 inches to 5 feet or more. It is ideally suited for fast production on steel mill rejects or bulky railroad and heavy industrial scrap in any length, without prior torching or other costly pre-handling.

This new Verson shear is for sale or lease. Or it may be installed in your plant on a toll basis and operated by our experienced personnel.

SPECIFICATIONS

Shear Capacity	900 tons
Hold-down and Crushing	300 tons
Total	1200 tons
Opening Width	72″
Opening Height (center)	37″
Opening Height (at ends)	27″
Stroke of Shear	38″
Shear Angle (inverted V)	15°
Conveyor Length and Width	432″ x 66″
Charging Box Depth	30″

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LOOK FOR A DOWNWARD REVISION IN AUTO production in February from original estimates of 725,000 cars. First weeks' schedules don't reflect any softness. But unless sales pick up, the industry can hardly take 725,000 cars this month without building up a monumental inventory of new cars. In January, production totaled 688,000 cars.

WHILE AIRCRAFT COMPANIES IN GENERAL are suffering from cutbacks in military aircraft, deliveries of utility and executive aircraft continue to climb. According to Aerospace Industries Assn., the general aviation fleet will increase from about 70,000 aircraft to 120,000 in 10 years.

SOUTH AMERICA CONTINUES TO BE a good export market for farm machinery. This outlook includes long-range markets, as well as short-term. A new study by the BDSA of the South American market potential makes this prediction, but also cautions that European competition is stiffening and a trend to manufacturing in South American countries is developing.

INDUSTRIAL PHOTOGRAPHY IS GETTING BIG TIME. This applies to industry's growing use of movies for a wide range of purposes, but also to the equipment makers. One photographic equipment company expects to quadruple industrial sales in the next ten years. Industrial photography is aimed at training, quality control, time-motion studies, and in-plant traffic studies in addition to primary objectives of sales promotion and advertising.

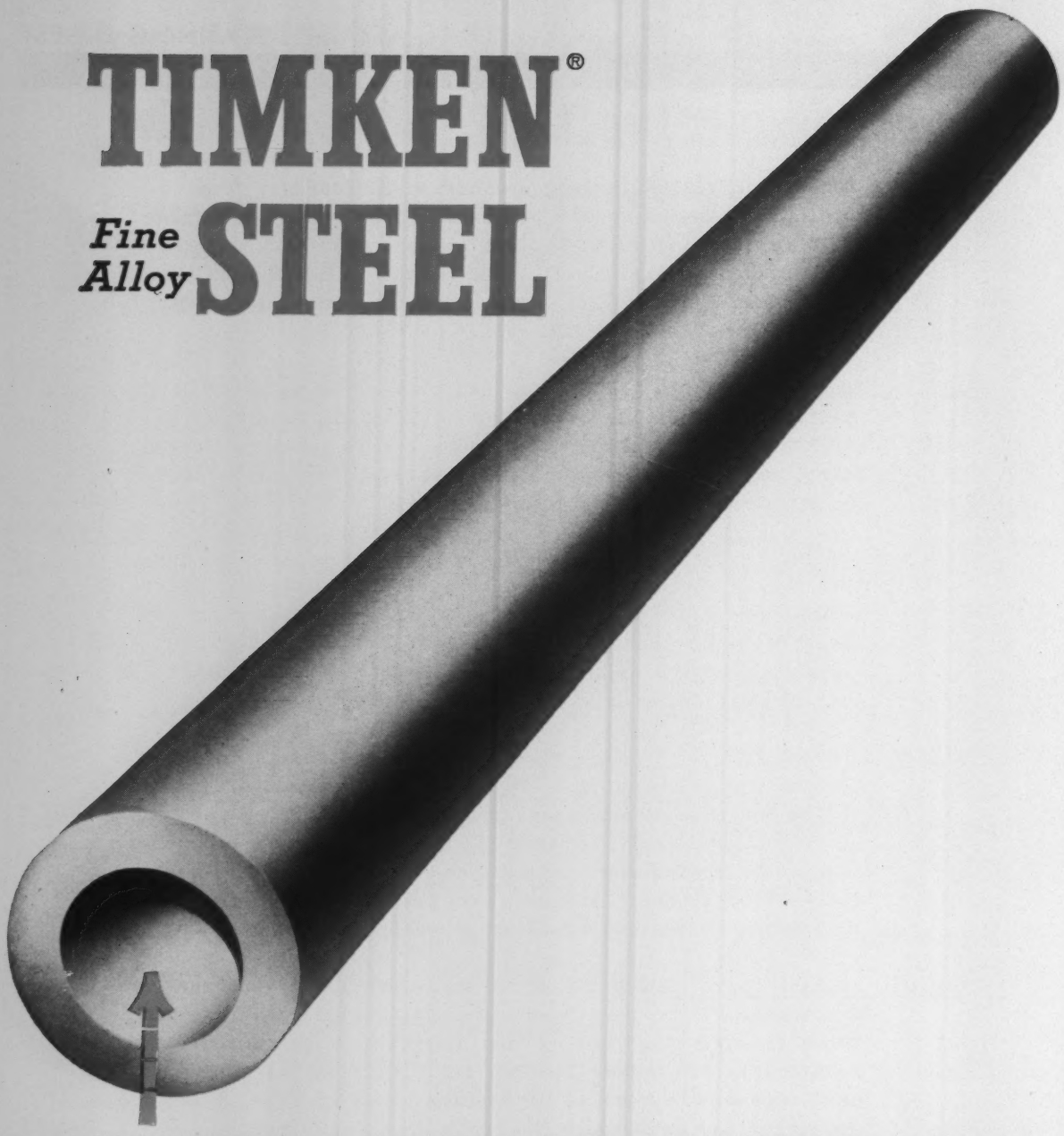
AUTOMATIC ASSEMBLY MAY PROVIDE the greatest avenue for advancement of automation. There have been some spectacular failures, but there is a growing feeling that assembly offers the greatest possibility for automatic handling. Illustration: One auto parts supplier assembles 2600 spark plugs an hour on a machine requiring one operator.

IS CYCLICAL BUYING COSTLY AND WASTEFUL? While aiming his points at the electrical utility industry, W. S. Ginn of General Electric Co. says it is. He urges the industry to add capacity on the basis of historical growth trends, and therefore avoid sharp peaks and valleys of cyclical buying. Production costs, he says, run more than 10 pct higher under cyclical conditions.

A STEEL SCRAP COOPERATIVE which would bypass brokers and sell directly to the mills is under study in Ohio. Idea would be to create large offerings to fill big orders and also be able to compete in bidding on large industrial lists.

TIMKEN®

Fine Alloy STEEL



Ready-made savings for your hollow parts

Why bore out bar stock to make your hollow parts? Start with Timken® seamless steel tubing; the hole's already there. You save drilling costs, steel, machining time and you're sure of uniform quality finished parts, too. That's because we make Timken steel tubing by forging a solid round over a mandrel, thoroughly working the metal inside and out. This gives the tubing its fine forged quality and uniform spiral grain flow.

When you buy Timken steel you always get: 1) *Quality* that's uniform from heat to heat, tube to tube, order to order; 2) *Service* from the experts in specialty steels; 3) Over 40 years of *experience* in solving tough steel problems. Let our engineers help you save by recommending the most economical tube size for your hollow parts job . . . one guaranteed to clean up to your finish dimensions. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

TIMKEN ALLOY STEEL AND SEAMLESS STEEL TUBING ARE AVAILABLE FROM WAREHOUSE STOCKS IN 44 CITIES IN THE UNITED STATES

AVOIDS TRAFFIC: Air Express uses helicopters between the airports serving New York City.

JET SERVICE: New jetliners carry cargoes as well as passengers on cross-country flights.

Metalworking Leads Air Cargo Use

Metalworking companies are already the biggest users of air freight.

But the airlines are going after more of their business in the future.—By H. R. Neal.

■ Air freight business reached new heights in 1959. It's now climbing toward the billion ton-mile level.

The industry believes it has only broken through the tops of the clouds. There are still some industry problems to cope with, but going into the 1960's a virtually unlimited ceiling is anticipated. And the rate of ascent for air cargo is going to be much steeper than in the past.

Tough Competition—Cargo transportation is a competitive business. And air transportation has been in the premium class. Compared with rail, water or trucks, the cost has been high. And there have been other limitations.

More Metalworking—But companies in the air freight business are out to change this. They expect to bring about lower rates in the next few years. And they're changing their approach to selling shippers on the merits of air transportation over other methods.

Metalworking companies can expect to receive more attention from air freight salesmen. The reason for this is simple. Metalworkers are already among the largest users of this form of transportation.

The Big Users—American Airlines is the largest carrier of air freight in the U. S. Last year its volume reached 103 million ton-miles, the first airline to reach the 100 ton-mile figure in a single year.

An airline study shows that over the past several years, 12.5 pct of its volume was in machines or machine parts. It was the largest single classification. Electrical equipment and parts made up 8.4 pct of the traffic. Next in line were automotive parts and accessories which accounted for 8.1 pct of its total.

Shipment Breakdown—No other classification accounts for more than 8 pct of American's air freight. And only a few non-metalworking commodities keep aircraft parts and accessories (5.4 pct) and miscellaneous metals and metal products (3.1 pct) from making up the top five types of products shipped by aircraft.

Air Express, division of Railway Express Agency, maintains an even more detailed study of the items it handles for shipment. In a twelve month period which ended June 30, 1959, Air Express handled nearly 5.8 million individual shipments. The general category "materials associated with manufacturing and related activities" accounted for 1.4 million shipments, 24.5 pct of the total.

This is further broken down into two narrower groupings: materials

used for assembly or further processing; and tools, equipment and supplies for production use.

Product Listings — The first group, with 15 separate classifications of types of materials, accounted for 21.4 pct of total shipments. Leading the list were electronic parts with 4.8 pct.

Auto parts ranked high, also (2.3 pct). Others on the list include: missile and rocket parts (1.4 pct); aircraft parts (2.9 pct); fastening devices (1.7 pct); electrical parts (1 pct); small parts of plastics, rubber, etc. (1 pct); and castings and stampings (0.9 pct). The remaining classifications accounted for fewer than 50,000 shipments each.

Six classifications of materials for production use made up 3.1 pct of total shipments. These included chemicals and adhesives; machine tool accessories; packaging materials; special purpose hand tools; electrical and electronic equipment; and miscellaneous production supplies and equipment.

General Purposes—Another general grouping covers parts for repair, replacement or installation from suppliers to repair services, users, and installers. About 18.2 pct of Air Express shipments were for these purposes. Automotive, aircraft, electrical and electronic, heavy equipment, and machine tool industries were among the leading shippers.

Air Express has only been keeping such detailed reports for a short time. But its goal is clear. It wants to know who its users are and why they use the service. With this information, it expects to further improve its service. And it is also studying ways to reduce its costs, with an eye toward making its rates more competitive with other forms of transportation.

Not Just a Movement—G. E. Cole, Railway Express' director of market research, says: "An Air Express shipment is not just movement of a package between destinations. It's a transaction."

He points out that the company's service starts with pickup of the shipment directly from the shipper. It also handles routing, sending the shipment in the fastest possible way. It then delivers the shipment to its destination, with overnight delivery almost a certainty.

And it's speed of delivery that air freight companies intend to sell.

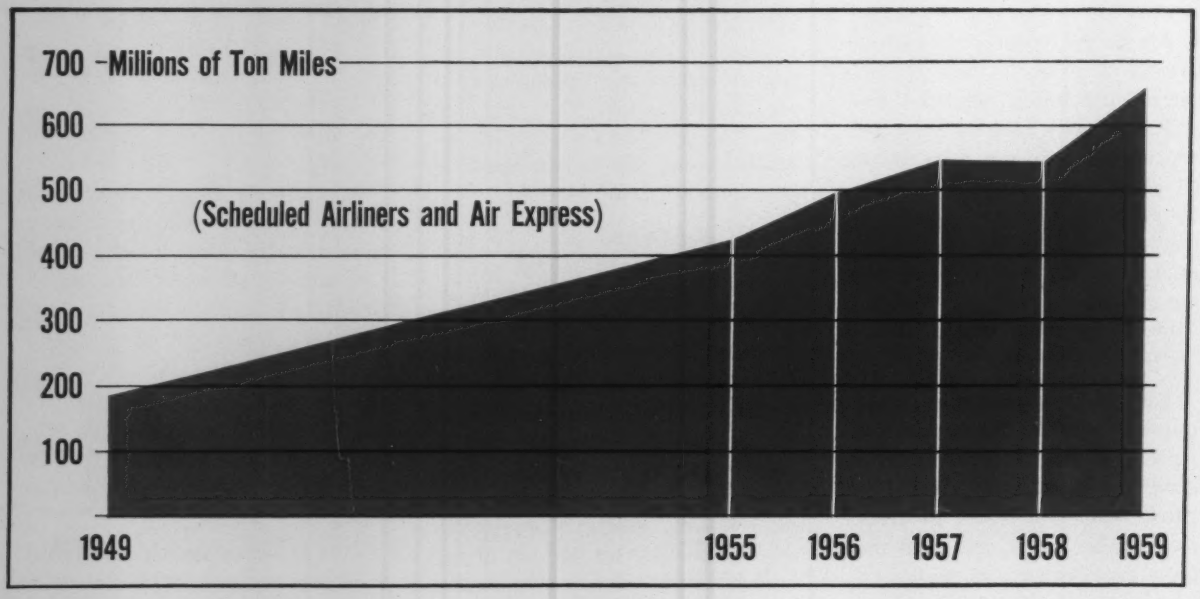
The American Plan—American Airlines furnishes an example of efforts in this direction with its emphasis on "distribution cost." It has established a consulting group, working under the sales division, which will analyze the "total" cost of moving a product from the end of the production line to the end user.

Raytheon Mfg. Co. has just switched to centralized distribution for electronic and radio tubes for most areas. In doing so, it closed about half of its warehouses around the country. But, an American representative says, the company can give just as good service from its central warehouse at Waltham, Mass., by shipping orders air freight.

At the same time, Raytheon has eliminated the overhead connected with maintenance of the warehouses and the workforce. And more important, it has freed money tied up in inventories.

Punched Cards — Distribution centers now look like offices instead of warehouses. And a few office

Airfreight Continues to Climb



personnel make up the staff.

For an example of how it works: Dealers receive tubes in packages of four. With each package is a punched card with a description of the part, dealer, location, etc. When tubes are sold, the card is sent to the area distribution office. There it is run through a machine which transmits the data to Waltham where a duplicate card is punched out on the receiving machine. This card is placed in another machine which translates the punches into a typed order with copies.

One copy goes immediately to the warehouse floor where the order is packaged for shipment. It's then sent to the airline which ships it to its destination overnight.

Count Total Cost—Other manufacturing companies are now looking at the plan. And a washing machine manufacturer is seriously considering shipping its products by air. Its dealers would stock only one or two washers instead of 20 or 30. Customers would see the basic machine, pick out added features they want from a catalog.

The company thinks it can custom build and deliver the washers just about anywhere in two days time. The added cost of air freight would be offset by lower "total distribution cost." Both the company and its dealers would have less money tied up in inventories.

Airlines are also trying to get lower rates. Present freight rates were set shortly after Word War II when air freight was just getting started. They were designed to protect small operators from a price war.

Bigger Payloads—Now, the industry is strong—and growing. Cargo carrying capacity of planes has grown too. And so has speed, which means each plane can make more trips.

The new jet and turbo-jet planes will be able to carry even larger payloads and at faster speeds. As yet, there are no all-cargo, jet powered planes in commercial service. But they can be expected soon.

Depreciation Reform Prospects Fair

▪ Industry has given "compelling arguments" on the adverse effect of U. S. depreciation policies on business here and abroad.

This is the opinion of Rep. Wilbur D. Mills (D-Ark.), chairman of the all-important House Ways and Means Committee which recently held hearings on tax reform and depreciation.

(A full report on the hearings, plus discussion on industry's depreciation methods, appeared in a series of three IRON AGE articles —Dec. 3, 10, and 17 issues.)

Changes Suggested—In a recent address, Mr. Mills said the majority of business witnesses before his committee "were in favor of increased, rather than decreased, depreciation allowances."

He listed some of the changes they suggested: Accelerating depreciation deductions through shortening depreciable lives, increasing the allowable depreciation rates; allowing depreciable lives; increasing the year of acquiring equipment.

"Proponents of these accelerated depreciation proposals would also provide ordinary income treatment rather than capital gains treatment to the proceeds received on the ultimate disposition of rapidly-depreciated assets," he added.

Favors Growth—In his speech, Mr. Mills stressed that "gearing tax reform to economic growth was not inconsistent with the basic purpose of taxation."

But on depreciation he warned, "The advantages of adopting liberalized depreciation rules and the resulting effect on revenues must be balanced against the distortion that would inevitably result in the distribution of the total tax burden among other sectors of the economy. It is conflicting factors like these that the committee must weigh in its overall consideration of a program of tax revision and reform."

REP. MILLS: "High tax structures limit initiative."

Rates Too High — He agreed that "tax rates are too high and have a strong tendency to blunt incentives and stifle economic growth." The present high tax structure, he says, "limits initiative and causes tax considerations to over-ride business decisions which would otherwise be dictated by the signals of the market place."

Mr. Mills held out some hope for tax cuts if tax reforms can be adopted. But he questioned whether the country would have a $4.2 billion budget surplus in fiscal 1961 as predicted by the President. But if there is a surplus, he believes it should be used to reduce the national debt.

Aluminum Aims at Mass Markets

Alcoa Moves to Develop Big Tonnage Users

One step is hot metal contracts. Another is a move into end product fabrication.

And the sales staff is reorganized along market lines. —By G. J. McManus.

▪ Aluminum's pitch for mass markets moved along more clearly into focus recently with developments in the auto and building fields.

On the one hand, Aluminum Co. of America agreed to supply General Motors with hot metal for auto castings. Also, Alcoa has taken a series of steps toward fabrication of more end products.

No Real Conflict—On the surface, the moves seem to be opposing trends. In its auto agreement, Alcoa is selling raw aluminum, with no processing. In building, the company is extending its processing to final fabrication.

However, the developments have two points in common. Both involve selling along market lines. Both aim at securing mass markets and massive customers.

Executive Shakeup—Alcoa is doing a number of other things to get deeper into the market place. Last week, a top level shakeup moved F. J. Close up to the number two sales spot, vice president and general sales manager. Mr. Close is a pioneer in the architectural field, and a long-time advocate of the market approach to selling.

Within the sales department, Alcoa has created seven major industrial groups.

(For FTC ruling against Reynolds Metals, See P. 204.)

New Attitude — Until recently Alcoa hesitated to get into competition with its customers. The mill would work with customers on development and would step in if there was a vacuum. But Alcoa's general policy was to stay away from fabrication.

A change in company thinking was indicated last year by Alcoa president Frank L. Magee. He said Alcoa planned more fabricating activities.

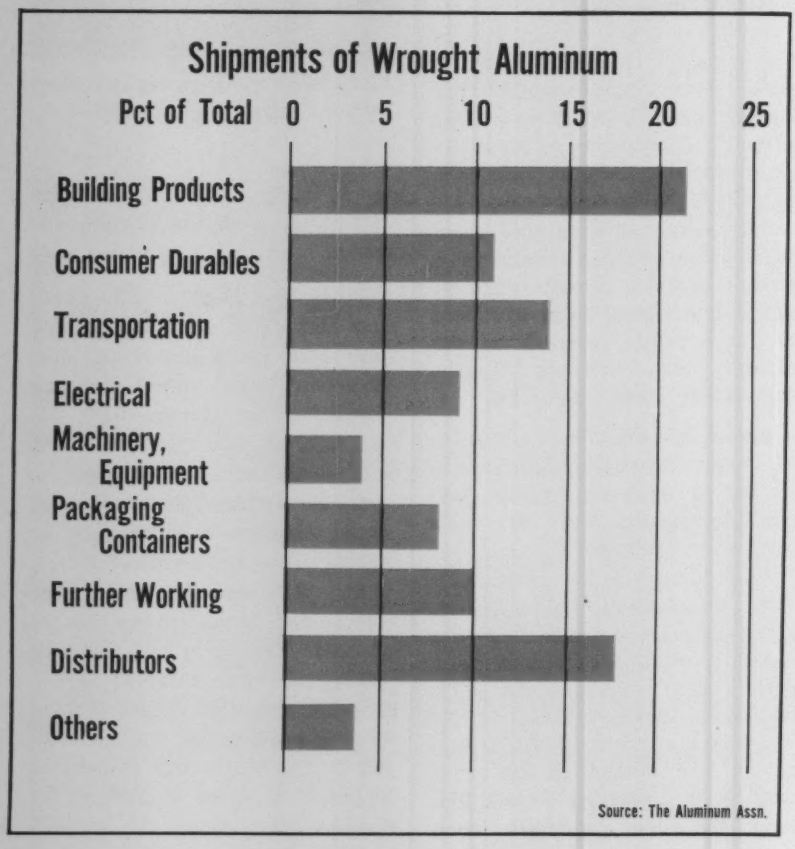
The new philosophy has been applied at an accelerating rate. Last year Alcoa moved strongly into the wire field with the acquisition of Rome Cable Corp. This year, the company took over Rea Magnet Wire Co., Inc.

The company last month acquired Cupples Products Corp. of St. Louis. The move gave Alcoa a facility for making doors, window frames and curtain walls. It added an 800-man operation with plants at St. Louis; Dallas, Tex.; and Dowagiac, Mich.

Among the new Alcoa products, clapboard siding is getting the biggest push. A $2 million promotional program is underway. Contracts with five companies have given the product distribution to 25,000 dealers and dealer-applicators.

Distributors — The distribution agreement is one answer to an im-

Where Aluminum Products Go



mediate problem for basic aluminum. At the moment producers are not geared to selling at the consumption point in widely scattered markets. Reynolds has met this with a distribution agreement with the lumber dealers association. Alcoa has contracted for distribution services and is studying the whole field carefully.

Why all this activity just now? An aluminum man explains it this way: Five years ago, producers were predicting 1000 pounds of aluminum per home by 1965. Now they are backing off. A top executive recently set a target of 500 lb by 1965.

Market Picture—Also, the entry of large producers may help concentrate some of aluminum's building tonnage. As it stands, the market for building products is shared by many fabricators. This means a great many relatively small orders for the basic producer.

Effect on costs of this scattering was indirectly shown when Alcoa came out with its new building sheet. One alloy was installed in place of several grades. This meant orders could be combined for production purposes. And with greater volume, Alcoa was able to cut prices by 7¢ to 8¢ a pound.

Apart from the immediate savings, such a trend would pave the way for more efficient mill equipment. Aluminum producers all have continuous heat treating lines under wraps. A four-stand cold rolling mill, now in operation, reportedly can roll aluminum sheet that could turn a profit at 10¢ under the current price.

Need Greater Volume — The problem has been that aluminum does not have the volume to justify high speed, continuous equipment. With 70 pct of all orders running under 5000 lb., you can barely warm up a mill designed for tonnage output. But with a base of volume orders, new equipment would bring savings that could open big new markets.

WhereFoundrySpendingGoes

Capital Needs Per Ton of Capacity

	For Modernization	For Expansion
Ferrous Foundries (average)	$10.70	$ 6.48
Under 5000 Tons Capacity	$21.50	$14.00
5000 to 25,000 Tons	$11.50	$ 8.20
Over 25,000 Tons	$ 8.50	$ 5.00
Nonferrous Foundries	$ 9.00	$ 4.50
All Foundries	$10.70	$ 6.60

Foundries Plan More Automation

Foundrymen's Society survey shows materials handling equipment is biggest single need.

Most foundries will spend more on modernization than on expansion.

▪ Materials handling equipment is the greatest single need of the foundry industry.

This is one of the conclusions of a new survey of capital spending needs and plans of the foundry industry.

Foundrymen's Survey — It was conducted by the American Foundrymen's Society in connection with plans for the Society's 1960 Castings Congress and Exposition in Philadelphia, May 9 to 13. (For details on foundrymen's capital needs, see The IRON AGE, Feb. 4, 1960.)

The evidence that materials handling equipment is the greatest single need of the foundry industry is not surprising. Most foundrymen concede that the industry's greatest area for advancement is in automation techniques.

In the Foundrymen's Society survey, 58 pct of all foundries, including 60 pct of ferrous and 44 pct of nonferrous foundries, list materials handling equipment as their most critical need.

More Output, Too—The survey notes that the larger the foundry, the greater the recognized need for better handling equipment.

All in all, the foundry industry in the U. S. and Canada expects an increase in output of 15 pct in 1960, 20 pct in 1961.

This means it will spend $509 million for new capital equipment and more than $6.5 billion in the next two years for supplies, materials and special services.

As indicated in the table (above) more than half of the capital spending, regardless of size and type of the foundry, will go for modernization.

Venezuela's Try at Democracy Starts to Show Results

Anti-Americanism is still strong, but relations, with the U. S. are improving.

The country has a long way to go, but the climate for investment from abroad begins to look better.—By Tom Campbell.

▪ The lively Tamanca Hotel in Caracas is jumping as usual with internationals. The sedate and conservative Avila hostelry continues to reflect stability. And the rumors in Caracas, that picturesque capital of Venezuela, are as rampant as those in Wall Street U. S. A.—and about as accurate.

Last week before President Betancourt rounded up those terrorists who like to play with bombs, there was some hysterical back-fence anxiety about explosions in all parts of the city. And, as usual, the purveyors of the "real dope" were sure there was a serious uprising in the air. There wasn't.

Slow Progress—To tough (and at times frustrated) Romulo Betancourt, things were going okay. Maybe a little slower than he had intended, but, after all, much better than they were going in Cuba—and in the Dominican Republic. Many Venezuelan citizens might find fault with such a statement, but a thorough checking shows a cross-section of the Republic supports Romulo.

Since Venezuela is still getting its stability from an all-party coalition, no one yet knows what would happen when the strongest party attempts to call the shots itself. That is still in the future. But the Communist party is doing its best to create dissension among the other three parties—without any success to date.

Recession hurts—Hard to take—and equally hard for the man on the street to understand—is the wave of unemployment, the apparent stagnation of business, and the timidity of Venezuelan private funds to flow into national endeavor. For more than a year now, the people have been waiting for a major movement upward in the nation's economy and activity. So far, this has not come with dramatic fanfare—nor is it expected to make its appearance that way.

To those who take time to analyze the situation, any attempt to sell Venezuela short would not only be wrong, it would be idiotic. Considering the impact of the Jimenez overthrow, the interim government, the popular election, the world situation, and the growth of nationalism, things aren't so bad in Venezuela. But there is a long haul ahead before the present administration can breathe a little easier — and the man on the street can stop listening to unnerving rumors, most of which have no basis in fact whatever.

Bankruptcies have been numerous in the past year. This has affected not only new firms, but has hit many oldtimers as well. Money is tight and credit is hard to come by today. In the face of this, many look to government to bail them out. Rather than rush into a series of leaf-raking projects the government has taken time—too much, say some—to plan for those things the nation wants, needs, and items which will liquidate themselves over the years.

Anti-Americanism — The feeling of anti-Americanism is still widespread in Venezuela. But it is not vicious as it was when Mr. Nixon was there. Relationships between Venezuelans and North Americans are not bad at all (the Commies excepted). The sense of anti-Americanism springs more from a new feeling of nationalism than from any other front. And this will not change in the foreseeable future. Yet it need not stifle attempts by both sides to work in harmony, plan joint projects, and look ahead to more stability and better business conditions.

To a North American used to recessions and booms, there is nothing unusual in Venezuela having its recession. Some think it is long overdue. And they feel it will take time to clean up, pay for or replace with better fiscal policy the spendthrift, credit-supported spree of the dictatorship.

Down to Earth — All the fancy raiment indulged in by the former regime is out the window. The present administration, now that it has assumed old debts, must pay the piper. It then must turn to more humdrum or prosaic things such as railroads, irrigation, iron ore, auto expressways, subways, agriculture and international relations as well as internal relations.

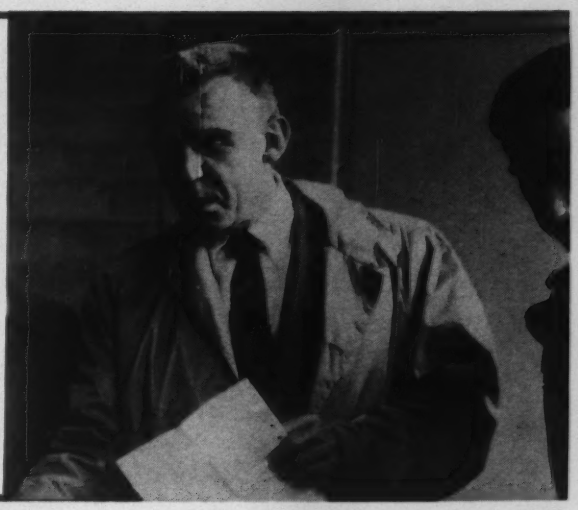
But what has happened in this nation of 6 million souls reaching for a real democracy in the face of the age-old complaint that "a democracy won't work here?" Nothing much has happened. But the mere fact that time after time attempted coups have been nipped in the bud suggests a good long term outlook. And despite the efforts of the Reds to play party against party, to keep the human pot boiling, and to make trouble in general, the Commies have not taken over the nation.

Oil Negotiations — The big-time negotiations between the oil firms and their workers are still going on. Last week there were at least a hundred items not yet agreed upon. And those agreed upon were not the most important. More important, but up in the air, are wages, fringes and other working conditions. The outlook is serious. But the govern-

Venezuela Revisited: A Test of "Simpatico"

A year ago, Tom Campbell, IRON AGE editor-in-chief, went to Venezuela to test the political and industrial climate for U. S. businesses. He found a nation painfully and enthusiastically on its way to a new-found democracy.

Now, after a recent trip to the country, comes another on-the-spot account of current conditions in that dynamic and important South American nation.



ment which expected a settlement some weeks ago is not being hysterical. It forbade a strike. Best guess of those who know is that eventually both sides will accept compromises.

With the world market in oil suffering from over-production and international rivalry, there is little or no drilling in Venezuela. That has meant lay-offs of workers, exodus of many North Americans, and less revenue for the Venezuelans. The tough competitive oil market means lower profits for the oil firms in Venezuela and thus less in taxes for the government. Any attempt by labor to boost labor costs, which will have to come out of earnings, won't rest well with the government. It has to have means of getting more revenue, not less.

Some oil people privately say that the boost in taxes more than a year ago is partly responsible for the recession in Venezuelan oil activity. They point to the Sahara and other African oil developments as proof that oil firms are looking elsewhere. Such a view is only partly correct and is not the main factor in the Venezuelan oil industry slowdown. Over-production, less earnings, heavy stocks of materials and a temporary holdup in new explorations are bound to result in what now faces Venezuela, the U. S. A., Canada and the Near East. When world conditions change so will conditions change oil-wise in those areas.

Industrial Climate — But the Venezuelan government is trying to step up internal improvements so there will be less dependence on oil. This has been the industrial keynote of the nation for many years. Railroad plans, irrigation projects, hydro-electric potential and fostering of home industries are all in the cards. Action on many of these items is but a stone's throw away. The pace of action in Venezuela will never be as fast as in the U. S. A.

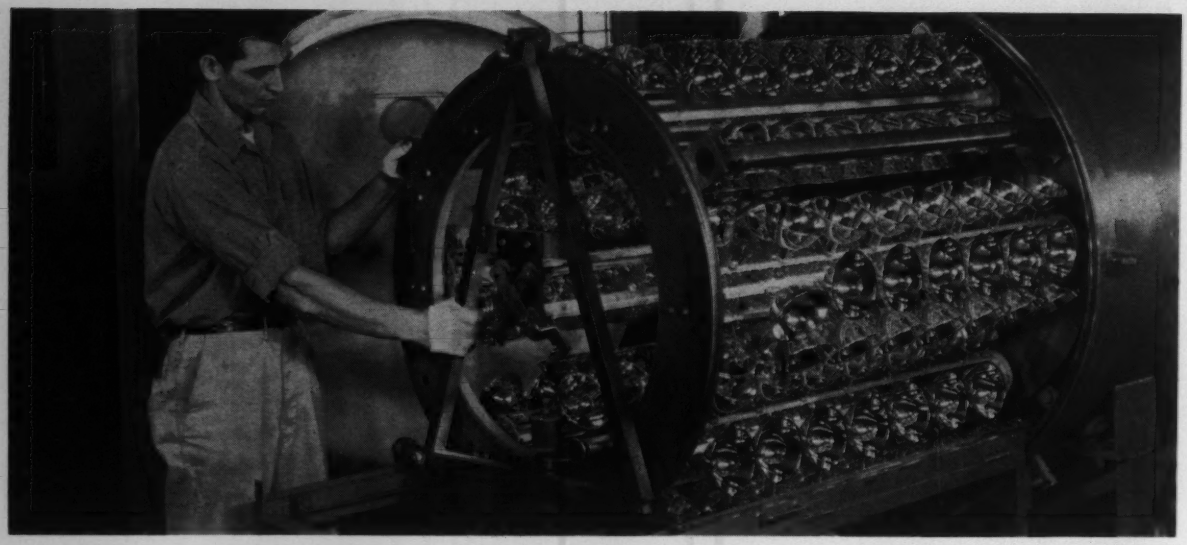
It is true that the "Venezuela for Venezuelans" slogan has gained much ground. This figures. A nation which has had to import most of what is uses can be expected to try to make more things at home—if it is to keep its people at work. More of this trend is in the making. But to offset the harshness of this, President Betancourt a few weeks ago went to great lengths to chastise people who are expressing anti-American feeling. He said he welcomed American investment and that Venezuela and U. S. A. were together in basic friendship. Those were not idle words of a South American politician. He means them, because he is quite familiar with both nations and what they should mean to each other.

Better Outlook—The Venezuelan president also made it plain that what Cuba did, said, or how it acted towards the U. S. A., had nothing to do with Venezuela's policies and feelings. And he also made it plain that the most vicious anti-American feeling was being fostered and spread by the Communists. Internally, the pressure on oil firms has subsided. The government is conciliatory, helpful, and is talking complete cooperation. That is a good sign even though some die-hard North Americans have their fingers crossed.

Probably the best test of the basic philosophy and potential of Venezuela can be had from old-time North Americans who have lived, understood and loved Venezuela over a long span of years. If you listen to them it runs something like this:

"Anyone who sells this country short is crazy. The zest for making democracy work is laudable and in the long run it may be successful. The feelings of nationalism are to be expected as they are in other nations that have thrown off the yoke of colonialism or dictatorship. For North Americans to get uppity or frustrated with Latin American growing pains is as foolish as it is useless. For my money, there is room here for those who have their eye on the future, on reasonable returns, and on a cooperation that really means fifty-fifty. And this doesn't mean we have to be pollyannas or naive children. All we have to do is show some sign of understanding, savvy and be sympatico."

So there it is—at this moment!



FOR INDUSTRY: Photo equipment makers are upping output to meet demand for more industrial movies.

Industrial Films Are a Big Draw

Tab for industrial movies ran to $171 million last year, will top this in 1960.

New equipment will widen the possibilities for low budget productions.—By K. W. Bennett.

▪ The whir of cameras and the bright lights of moviemaking are a common occurrence in many industrial plants.

U. S. industry paid out $171 million to professional moviemakers in 1959. This was 14 pct more than in 1958.

Will Spend More—There is little doubt industry will commission even more movies this year. Spending for plant movies will be up about 10 pct.

The amount spent to make industrial movies by companies with their own photographic staffs is difficult to calculate. One source figures it was about $150 million last year, will be more this year.

Sales promotion and prestige advertising are still the biggest aim of industrial movies. But in 1959 metalworkers made movies for training workers, time-motion studies for company records, for quality control, work progress reports, in-plant traffic studies, safety training, machining and manufacturing research.

New Movies—One new and growing use of movies in industry is use of ultra-high speed cameras for special research on such as the progress of an exploding dynamite cap, the pouring of a steel ingot, or recording the pattern of a 14,000 mph shock wave in flight.

Also, a rapidly growing use: Movies to show a product in action to a potential customer where actually bringing the item is impractical. Large machinery for export sales is an example.

The Bill—Budgets range all over the lot. One source figures the average cost of an industrial movie is about $25,000. But Willys Motors made a sales promotion film on a new truck model, with dubbed-in sound, for about $1000. A Standard Oil movie came very close to a half-million dollars. More high-budget industrial movies feature well known Hollywood personalities.

Television has expanded the viewing possibilities of industrial films. U. S. industry has about 5000 films now being distributed by various representatives. An Eastman Kodak spokesman estimates that these films could, in their life span, be seen by over half the U. S. population.

Suppliers Happy — The photo equipment making industry is alert to the boom in industrial movie making. "If we can't treble or quadruple our industrial sales in the next 10 years, we shouldn't be in the business," said C. A. Musson, industrial sales manager for Bell and Howell Co. His company is the biggest U. S. producer of 8 and 16 mm motion picture equipment.

Eastman Kodak Corp. will bring out this year, a new high-resolution, high-speed 8 mm film. Several manufacturers will announce the marketing of sound projectors for 8 mm film. And Fairchild Camera and Instrument Co. has introduced an 8 mm movie camera which will record sound simultaneously with the pictures.

Battle Begins Over Agency Shop

Fight Resumed on Right-to-Work Laws

More wrangling on the right-to-work issue has been touched off by "agency shop" section of new steel contracts.

Court tests coming on the rule which permits unions to collect fees from non-union workers.—By N. R. Regeimbal.

▪ Steel industry workers, their union, and the companies are engaged in a new right-to-work controversy. This involves the so-called agency shop, included for the first time in the new basic steel contract.

Under the agency shop, unions collect a "service fee" from non-members equal to the dues paid by members. The service fee is collected by employers under the check-off system.

It's designed to get around right-to-work laws, now in effect in 19 states, where compulsory unionism is outlawed.

Court Test Wanted—Backers of the right-to-work principle, including former Rep. Fred A. Hartley of New Jersey, are insisting that the agency shop is an illegal use of federal laws to invalidate state laws. They are now planning to use an Indiana court case to try to get the agency shop controversy to the U. S. Supreme Court.

Mr. Hartley, co-author of the Taft-Hartley Act, says, "Nothing in the (Taft-Hartley) act was to be construed as authorizing any closed shop, union shop, maintenance of membership, or other form of compulsory unionism agreement in any state where the execution of such agreement would be contrary to state law."

Union's View—Unions, including the USW, claim that the Taft-Hartley Act simply permits states to adopt right-to-work laws under which union membership cannot be a requirement for employment. But they argue that the T-H Act permits the agency shop.

Arthur Goldberg, general counsel, United Steelworkers of America, says, "Congress did not extend to the states a right to ban compulsory union dues or service fee payments."

According to USW spokesmen, Mr. Goldberg expects the agency shop provision of the new basic steel contract to wind up in the courts. While the union doesn't expect to run into trouble with the major steel companies, it does expect some small steel firms, particularly the fabricators, to join in the fight to have it tossed out.

USW Strategy — USW officials say they expect to gain only 8,000 to 10,000 new "non-voting members" (workers who will pay the service fee, but won't join) in the basic steel industry.

They admit, however, that its greatest impact for the USW will come in industries which the USW has not been able to fully organize, such as in fabricating and some non-steel industries in which the USW is active.

Unions argue that the service fee is simply a method of requiring all workers to pay their "fair share" of the costs of collective bargaining. Unions under the Wagner Act are required to bargain for all workers in a plant or a unit, including non-members.

How to Speed Labor Rulings

▪ How can National Labor Relations Board decisions and rulings be speeded up?

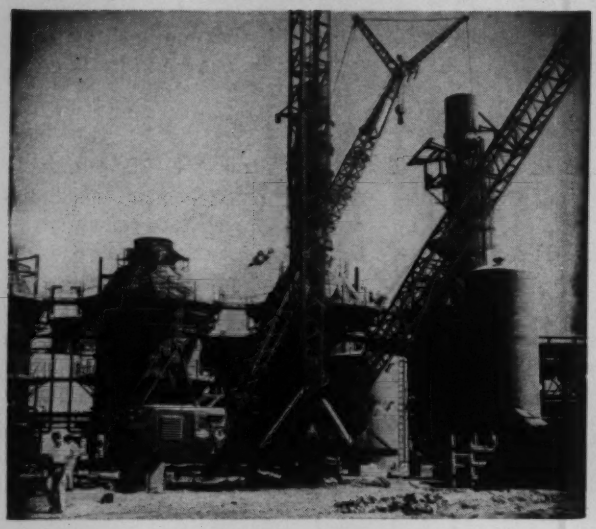
By freeing board members from administrative red tape, says a panel of labor experts. The panel, appointed last year by the Senate Labor Committee, believes this will allow more time for judicial and enforcement activities.

What's Recommended — The panel's specific suggestions are: Formation of a special group of NLRB trial examiners to handle union representation hearings and order elections. Giving all trial examiners broader administrative functions. Limiting the number of cases where trial findings are reviewed by the entire board. Creating a special administrator to handle housekeeping functions of the agency.

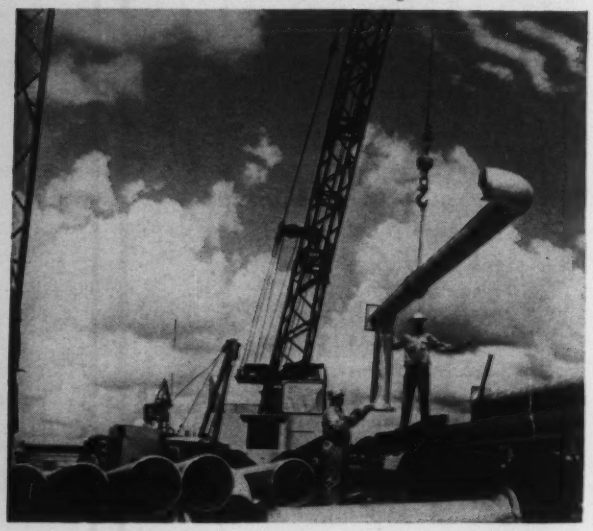
More Freedom — With these changes, the panel says, board members would be free to personally hear oral arguments in the cases they do review. They could also write personal opinions in policy-setting cases.

The panel was created by Congress to come up with broad recommendations for revising the Taft-Hartley Act. Passage of the Landrum-Griffin Labor Bill made these recommendations unnecessary. So the group limited its findings to ways of speeding up present labor laws. It also urged amending the Taft-Hartley Act to allow the NLRB to seek injunctions against employers as well as unions.

Metalworking Projects: Sponge Iron and Aluminum Pipe



MEXICAN HIGH-RIDE: Crane raises equipment into place for a new direct iron ore reduction plant to make sponge iron in Mexico. M. W. Kellog Co., New York, is building the plant for Fierro Esponja, S. A., subsidiary of Hojalata y Lamina, Monterey.



LIGHT LOAD: Single rope load sling is used to lift this 30-ft section of 10-in. diameter seamless aluminum pipe. It's part of a 1600-ft natural gas line designed to deliver 50 million cu ft of gas daily to Kaiser Aluminum's Baton Rouge alumina plant.

Inland Steel Expands Galvanized Lines

Inland Steel Co. will expand its galvanized steel sheet production by 35 pct.

The program includes addition of a new continuous galvanizing line. Three are already in operation in the company's Indiana Harbor works at East Chicago, Ind.

Completion of the new line is scheduled for 1961. It will coat coils up to 60 in. wide at a rate of 300 fpm. It will have a rated capacity of 120,000 tons a year.

Additional equipment added to the new line will allow the substitution of aluminum coating for zinc.

Court Calls for Study Of Wire Imports

A Federal court has struck at imports of barbed wire.

The new court action in Washington, D. C., affirms an earlier opinion of an appeals court ruling. The ruling held that the U. S. Tariff Commission has an obligation to study barbed wire imports and report whether or not they threaten domestic wire producers.

The Tariff Commission has tried to avoid making the study. It claimed refuge under a law stating U. S. farmers are to have the advantage of the lowest prices for barbed wire, regardless of the country of origin.

Effect of this law has been upset by the new court ruling, which holds that the Commission must, upon request, look into the problem of imports.

Steel Imports Set New Record

Steel imports set another record in December, the Iron and Steel Div., Business and Defense Services Administration says. Exports continued their recovery from steel strike low levels.

December imports totaled 539,000 net tons. This is 78,000 tons more than the record set in November. Increased imports of plates, sheet and strip, and pipe and tubing accounted for the rise. Imports during all of 1959 were 4.4 million tons.

Steel exports in December rose to 113,000 tons. This is 52,000 tons more than in November, but is still below pre-strike levels. Exports for all of 1959 totaled 1.5 million tons.

Improvement Program Set by Wheeling

A $5.7 million improvement program for plants and facilities in West Virginia has been announced by Wheeling Steel Corp.

Paul W. Koenemund, vice president, operations, says the program will increase operating efficiency, provide for new products, and stop production of items no longer in demand.

On the Move—As part of the program, Wheeling will move equipment and production facilities at the Beech Bottom, W. Va., works to the Follansbee, W. Va., department of the Steubenville Works.

Operations to be moved include: The long terne sheet line and silicon sheet, silicon strip annealing and core plating facilities.

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As one in the metals fabricating business—whether design, production or purchasing—you'll have a special interest in the stainless products for the home now featured at your leading store. The eye-opening promotion of variety, beauty and utility in stainless home products today is doubly impressive to the man who sees the technical accomplishments behind the glamor. • Many of the pieces will have been crafted from SUPERIOR Stainless Strip Steel—chosen for uniform highest quality in every coil. Specify it safely for your strictest demand.

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With the acquisition of The Northern Blower Company, Buell can provide a broad range of products and systems for handling every industrial dust and air pollution problem. Norblo bag type collectors now augment Buell Cyclones and other mechanical collectors, electric precipitators, combination systems and centrifugal and gravitational dust classifying systems. And like Buell, Norblo has been accepted and proved through years of experience in active, on-the-job service. Thus Buell is better able to meet both standard and special requirements in fields that include the electric utilities, steel, oil, cement, chemical, paper, and other process industries. Buell Engineering Company, Inc., 123 William Street, New York 38, New York. Northern Blower Division, 6404 Barberton Avenue, Cleveland, Ohio. (Subsidiary: Ambuco Limited, 2-5 Old Bond Street, London, England)

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NORBLO

Thomas M. Bohen

The End of a Career in Metals

T. M. Bohen retires this year after 50 years in the nonferrous metals warehouse business.

From the beginning of his career to the present he has been an aggressive and successful man.

THOMAS M. BOHEN: "A distributor has to be fast on his feet."

■ It didn't take long for young Thomas Bohen to show he was going places in business.

His first job, after graduation from Commercial High School in Brooklyn, was with U. T. Hungerford Copper and Brass Warehouse. He was paid $8 a week as a salesman, yet he soon became the best dressed man in the company.

Best Dressed—His secret: When a young salesman brought in a particularly big or tough-to-get order, Mr. Hungerford would invite the man to visit a tailor and order a suit at Mr. Hungerford's expense. They say Tom Bohen had more suits than anyone.

This year Thomas Bohen retires, 50 years after breaking in with Hungerford, as president of Whitehead Metal Products, Inc., a multi-million dollar nonferrous warehouse.

A Key Man—From the beginning the record shows many accomplishments. He helped found Whitehead Metals, along with Jud Whitehead, on only $25,000 capital. He was a key man in smoothing over the bristling relations between the brass mills and the warehouses. And he was one of the small group that convinced the government of the contribution the copper and brass warehouse could make to the war effort at the beginning of World War II.

Yet, today Mr. Bohen advises the average bright young man graduating from college to accept an offer from—say a large chemical company, in preference to one from a nonferrous warehouse.

No Success Formulas—"A copper and brass distributor today, as in the old days, has to be fast on his feet," he says. There are no formulas for success in the warehouse business. Service is vital. But the basic rules of salesmanship that work everywhere work in warehouses, he says.

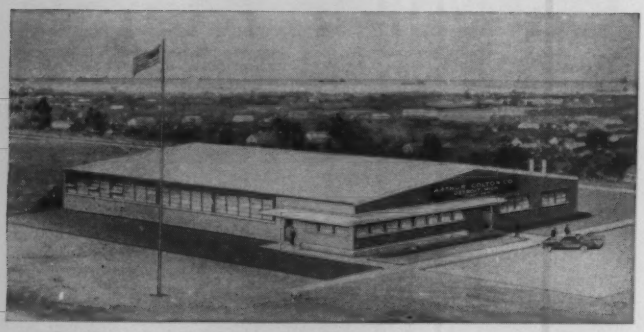
In contrast to the usual attitude of an old-timer to a current situation, Mr. Bohen doesn't think it would be anywhere near as easy, or inexpensive, to start a nonferrous warehouse from scratch today.

Personal Touch—For one thing, he believes imports, no problem at all until just recently, are now a serious problem and one "the industry is going to have to learn to live with rather than solve."

He counsels the nonferrous warehouse today to concentrate rather than expand. "Localized warehouses, familiar with the people and the problems of its immediate area will be the best equipped to meet the competition, domestic and foreign."

Mr. Bohen didn't say it, but it's apparent from his example that the important thing in making a successful career in metals distribution, particularly in today's markets, is the personal touch.

ANOTHER EXPANSION to Better Serve Industry in the Soaring Sixties



PLANT No. 4—ELK RAPIDS, MICHIGAN

PLANT No. 2—DETROIT, MICHIGAN

PLANT No. 3—MANCELONA, MICHIGAN

The recent opening of our Plant No. 4 in Elk Rapids, Michigan, marks the fourth expansion in our manufacturing facilities since we set up in business 35 years ago. In the intervening years, we have earned an international reputation for designing and building money-saving machine tools for many types of industries. We have also diversified our engineering and production talents so that our machines, which originally were specialized in metal-cutting operations, now reach into the nuclear power, electronic, chemical, drug, cosmetic and food industries and are used in processing many household products in everyday family use. To the many people who have helped us build this business, we say, "Thank you, sincerely."

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PLANT NO. 1—DETROIT, MICHIGAN

Is the Credit Squeeze Easing?

Businessmen are concerned, but not alarmed about the effects of tight money.

But there are some recent signs the pinch won't get any tighter.

■ Your business has probably been hurt in some degree by the tight money squeeze.

But, if you're typical of the average businessman, you feel you can live with the situation. Business executives are concerned, but not alarmed about the money squeeze. This is brought out in a recent survey of the National Industrial Conference Board.

Pinch Will Hurt—Only a few expect the scarcity of funds to hurt business volume, the study shows. But companies not already hurt by tight money feel the lack of funds and high interest rates will affect their cash position during 1960. And about 40 pct of those questioned look for a slowing down of their accounts in the months ahead.

Based on the results of the survey, tight money shouldn't do much to slow down capital spending. Only 3 pct of the companies feel the money pinch will force a cutback in their capital spending. One reason: Better than 90 pct expect to get the funds for spending entirely from internal sources.

Encouraging Signs—Such financing wouldn't put much added strain on the money market. And, in recent weeks, there are signs the tight money pinch won't get any tighter. Seasonal influences are working to hold down the demand for funds. Last week the U. S. Treasury was able to refinance some of the national debt at lower interest rates.

Earlier, there were fears interest rates might even go higher. Now some commercial bankers hope the prime interest rate — the rate charged leading borrowers — may not go above its present 5 pct. And the Federal Reserve Board has made no move to increase the discount (or borrowing rate) it charges its member banks.

However, the Administration shows no signs of relaxing its tight money policies. Concern about inflation is still a powerful influence in Washington.

Stable Now, But—Typical is the stand taken by FRB Chairman W. M. Martin in testifying before the Joint Economic Congressional Committee. Although noting that "prices are reasonably stable," he added: "It is possible we may encounter a renewed upward spiral, or find the underlying strength of the situation is not as great as most observers feel."

Pointing out borrowing and debt increased heavily in 1959, Mr. Martin said, "The economy would be in a very different and vastly worse position today if this enormous expansion of credit had been financed by a large-scale creation of additional funds by the banking system . . . and a rapid inflationary increase in the money supply."

Getting Ahead in Business

■ What qualities are needed to get ahead in the business world? Both management men and students are agreed (in a University of Michigan survey) that it depends more on what you do than whom you know.

Knowing the right people, playing a good game of golf and bridge, and belonging to the "right" fraternity are not necessary, the executives and students believe.

Work Ranks First—Among 25 characteristics given for reaching upper management, willingness to work hard leads the list. Other traits mentioned as vital: Personal integrity, communication skills, logical powers, self-confidence, adaptability, and an understanding of human relations.

Less important, but also necessary. Intelligence, technical knowledge, social grace, aggressiveness, optimism, and previous experience.

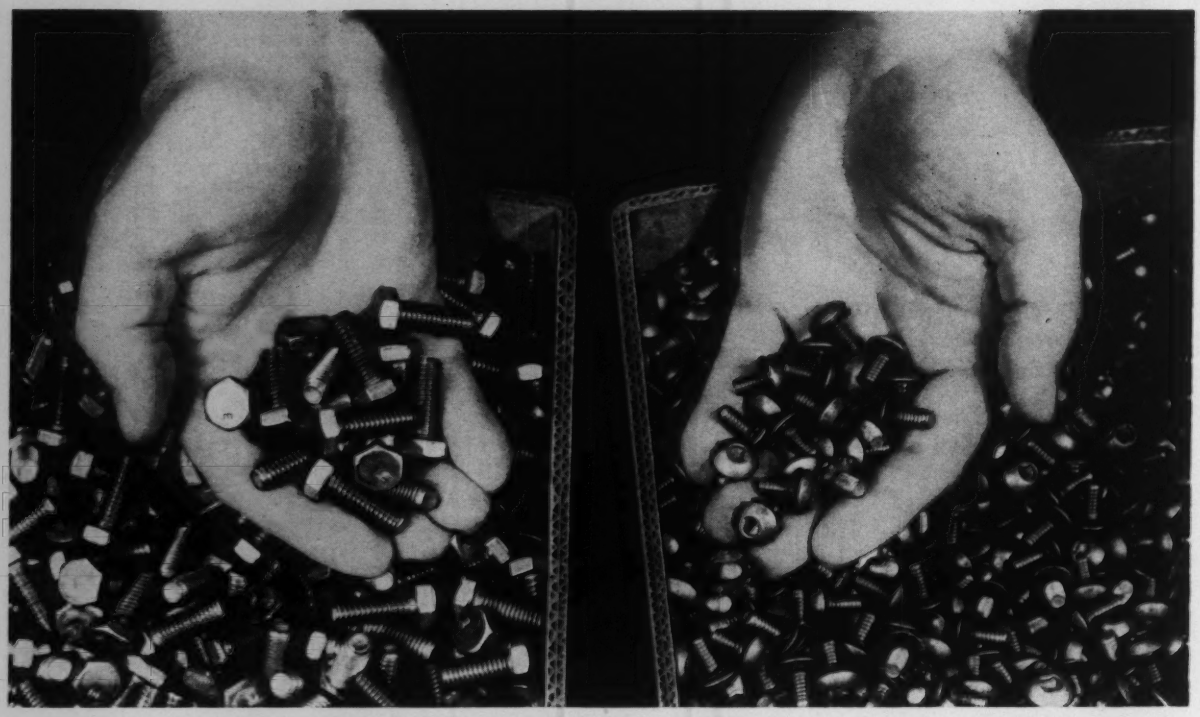
Other Qualities—Technical ability, persuasiveness, economic knowledge, appearance, and creativeness were also rated highly.

Knowledge of the humanities and business contacts were regarded as helpful, but not vital points.

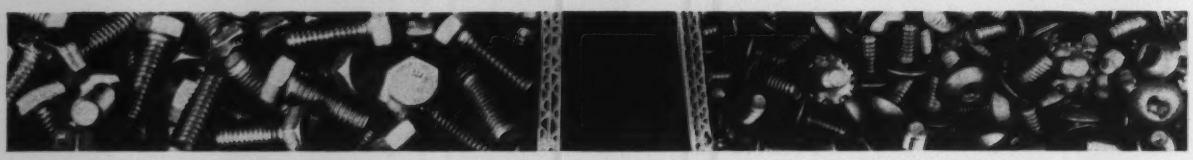
Generally business and engineering students are in agreement in rating traits. But business students rate personal appearance as more important than the engineers.

Interest More Than 10 Pct of Budget

The burden of carrying the huge U. S. debt grows greater and greater. Interest charges in fiscal 1961 could be 12 pct of the total budget of $79.816 billion. Payments on the debt, now about $292 billion, are expected to rise to a new high during fiscal '61. The total for financing could be $9.6



Picks up $97,000 saving in screws



Fastener survey by RB&W cites big saving in simple substitution of fastener types . . . no engineering changes needed

There were no engineering changes at all involved in this hard-to-believe case of cost reduction. The RB&W Fastener Man, called in to survey the use of fasteners in this particular company's machine, was asked to submit recommendations on a size for size substitution only.

Annual production consumed about 1½ million fasteners. Since the RB&W fastener specialist saw neither a design nor appearance reason for the costly alloy fasteners being used, he suggested (1) clutch head screws to replace the existing alloy screws; (2) standard bright and high carbon hex screws to be used at all other locations. Just that simple. At prevailing prices, costs of parts studied totaled $120,000; cost of the suggested fasteners: only $23,000 . . . a whopping, realizable $97,000 saving. Pure profit!

Are you *sure* you're not wasting fastener dollars? True, the savings offered may be more modest than the special case above. But they're certainly worth looking for through the eyes of an RB&W fastener expert. No obligation. Write Russell, Burdsall & Ward Bolt & Nut Company, Port Chester, New York.

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Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. Sales agents at: Cleveland, Milwaukee; New Orleans; Denver, Fargo. Distributors from coast to coast.

Ford and GM Go for Galvanized

It's Being Used to Conquer Corrosion Problems

Trend toward unitized construction, especially for compact cars, has made corrosion a critical problem.

Using galvanized steel is one good way to slow the rusting-out process.—By A. E. Fleming.

▪ Consumption of galvanized steel by U. S. passenger car makers will reach an all-time high this year. Requirements for the zinc-coated metal will be even greater in 1961. Leading the way will be the compact cars of Ford Motor Co. and General Motors.

Reason for the rise? The rapid trend toward unitized body construction, in which rustproofing of critical underbody parts is of particular importance; and development of new processes which are solving production-line painting and welding problems previously presented by galvanized steel (IRON AGE, May 7, 1959, p. 69.)

Link Zinc—A year ago the flow of galvanized steel to auto manufacturing plants was a trickle. Next fall it will be a flood. By then, estimates are the auto industry will be using 10,000 tons of galvanized steel a month. Annual consumption will exceed 100,000 tons.

How do steel companies expect to appease the new hunger of auto makers for galvanized steel in view of already critical shortages of the material? An important step is the investment of from $5 to $7 million in 10 or more new continuous galvanizing lines around the country. Six of the lines are scheduled to be running by June, four more by the end of the year. Automakers, particularly Ford and GM, will be waiting for the added tonnage with open arms.

POSITIVE PROTECTION: Key structural parts of Ford's Falcon are made of galvanized steel to reduce danger of failure due to rusting.

Dipping Debaters—Says one Detroit steel official: "If steelmakers had the capacity to turn out more galvanized material, automakers would have used more in the past. But there hasn't been enough to go around."

Things may be different soon. Besides Ford and GM, American Motors is said to be giving galvanized steel a close look on a trial basis. Chrysler is the least interested. Last year Chrysler spent $18 million for a new body-dip system of rustproofing for its unitized bodies. American Motors has been rustproofing the body-dip way since the 1957 model year. Ford has dunked Thunderbird and Lincoln bodies since the 1958 model year.

Galvanized Gains — Galvanized steel usage picked up last fall when production of Falcons and Corvairs began. Both cars have unitized bodies, in which the frame is built as part of the body. Ford Motor Co.'s Falcon, and the Comet which goes into production Feb. 15, are expected to use from 25,000 to 30,000 tons in the 1960 model year. Each Comet and Falcon requires about 100 lb of galvanized steel to turn out about 85 lb of parts.

Estimates are Falcon - Comet production will range between 500,000 and 600,000 units in the 1960 model year. By April, the Falcon alone will be using around 3100 tons of galvanized steel a month.

Best Bets—Chevrolet's Corvair is a step behind. Presently, the

Corvair has around 50 lb of galvanized parts. This could rise to 140 lb in the near future. Chevrolet has nearly solved a welding problem to its own satisfaction. Galvanized stock is moving into a Flint manufacturing plant to make panels and other parts.

Providing an extra boost in the 1961 model year will be Thunderbirds and regular size Fords. They will be using galvanized parts in rocker panels. Heavy use will also come from the Buick, Oldsmobile and Pontiac compacts that will enter the market as 1961 models.

Zinc to Zoom?—By the 1961 model year, upwards of 10,000 tons of galvanized steel a month will be needed by Ford and GM—3000 tons for Falcon, 3000 tons for Corvair, 2000 tons for B-O-P compacts and 2000 tons for Comets and standard Ford models.

This provides a big market for zinc producers, too. About 700 tons of zinc will be needed for every 10,000 tons of galvanized used.

Concern Over Corrosion—Why is the auto industry only now interested in galvanized steel? One view is given by J. C. Widman, manager of Ford Motor Co.'s Advanced Body Development. "After 2½ years of evaluation tests," he explains, "we decided galvanized steel is the best material we can find to protect unitized bodies against corrosion."

The problem of corrosion in unitized bodies is critical because of the box-type construction. Water, moisture and road salts are trapped and retained in the critical underbody parts.

Salt Solution — "We experimented with other processes," says Mr. Widman, "including dip painting, epoxy primer painting, terne plating, copper-bearing steel, plastic coatings, foam-filled sections, combination wax-grease sprays, vapor phase inhibitors and zinc-rich paints. They all have qualities to recommend them. But we feel galvanized steel guards best against corrosion."

Mr. Widman estimates galvanizing gives parts a 2½ to 3 times greater life span than the same parts made of conventional low carbon steel. He says this means parts can expect to be corrosion-free under normal car use from 10 to 12 years.

Penny a Pound—Falcon uses galvanized steel for rocker panels, floor side members, front rail extensions, rear rails and rear torque box.

"We consider these basic framing members of the car that must be corrosion-free," says Mr. Widman. "If these parts fail, the car is useless." It costs Ford about 1¢ a lb more for galvanized steel than regular steel. Adding processing treatments, it costs about $2 a car more to use galvanized parts. Ford's supplier is Weirton Steel Co.

No Welding Worries—"We were lucky a couple problems pertaining to galvanized steel were solved before Falcon production started," says Mr. Widman. One of the problems concerned spot welding tips. "After a couple hundred welds, the tips got encrusted with a brass alloy. It was formed by zinc from the galvanized steel and copper from the welding tip. The tip had to be cleaned frequently, creating costly production delays."

Mr. Widman says the problem was solved by substituting a zirconium-copper welding tip for pure copper.

Thick and Thin—The job was further eased by development of a process which led to differentially-coated galvanized steel. The steel is galvanized by a continuous hot-dip process. Then it is wiped on one side by a blade. The zinc coating on the wiped side is only ⅓ as thick as the unwiped side and is easier to weld. The thicker side covers the inside surface of the boxed members of the unitized body. The thinner side becomes the outer surface and is painted for added protection.

Should You Use Plastic Tooling?

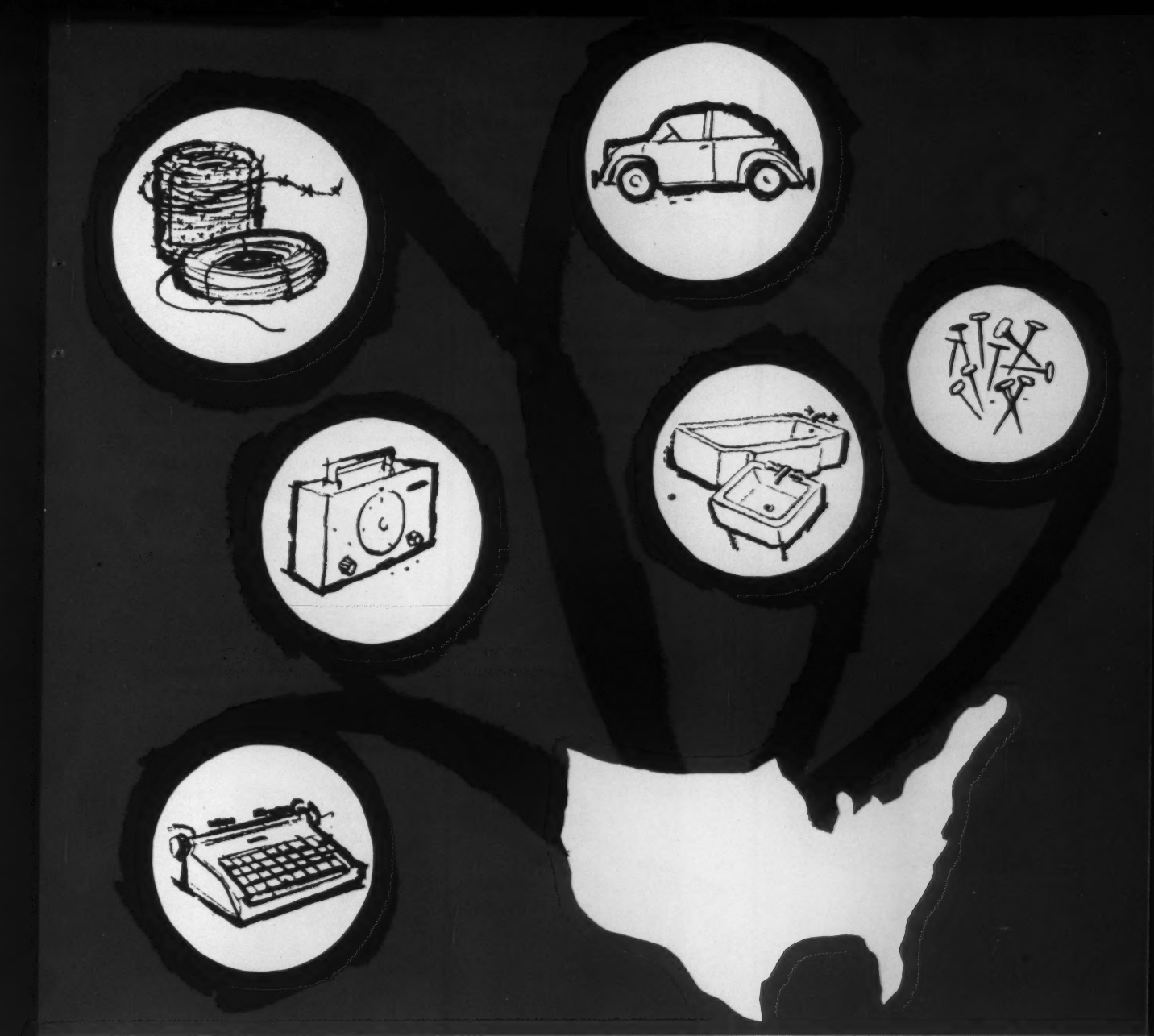
■ Now that plastics have found a place in the automotive stamping field, how far should auto makers go in replacing other materials with plastics? Opinions vary as plastics become more important to the tooling industry.

Says L. L. Linzell, technical assistant to the chief tool and die engineer for Chrysler Corp.'s Stamping Div.: "Plastic shouldn't replace iron or steel except on an experimental basis until the worker becomes fully aware of maintenance methods of plastic."

Mr. Linzell says plastics have been used successfully for prototype, experimental and production dies. To provide greater efficiency of plastics in stamping, Chrysler Corp. has set up a rigid set of standards: specific materials; specific methods of assembling materials; and a procedure for checking and enforcing plastics used.

Disseminate Data—Chrysler Corp. has had plastic dies which have produced as many as 20,000 body panels. Mr. Linzell gives evidence that plastic tooling can compete favorably with other types of low cost tooling. He points to a cost study of a draw die punch and pad for a quarter inside panel. It was found that an all plastic punch and pad die would result in a 40 pct savings over a boiler plate punch and pad die.

Mr. Linzell has a suggestion for establishing consistency in the use of plastics. He says the Society of the Plastics Industry might collect and disseminate factual data and case histories illustrating comparative results of using plastics instead of iron for a door or quarter panel, for example. Many plastic die failures would have been successful if such information would have been available, he says.



SIX DIFFERENT WAYS TO LOSE A JOB

The man in the picture at left could be your neighbor . . . or could be you. Shown above him are a few of the many imported articles he and other Americans have been buying at prices substantially lower than those of domestic products in steadily rising quantities. Each sale of an imported item means a lost sale to a domestic producer: each lost sale inevitably must be reflected in lower production by domestic producers which in turn must mean fewer jobs for American workers.

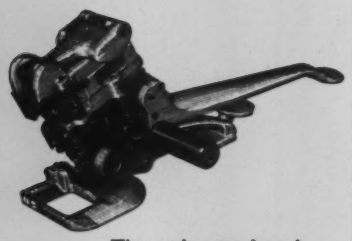
The problem of imports is one the ferro-alloys industry has had to face for several years, and the reason for our concern, while based naturally enough on our lost sales, is that this trend must ultimately have a serious effect on the jobs of every American. Further, this trend could all too easily affect the strength of American industry on which our entire economy is based.

Perhaps the import problem has not yet made itself felt in your industry. It will.

QUALITY SERVICE DEPENDABILITY

Ohio Ferro-Alloys Corporation
Canton, Ohio

Birmingham, Boston, Chicago, Denver, Detroit, Houston, Kansas City, Los Angeles, Minneapolis, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Seattle, Vancouver, B.C.



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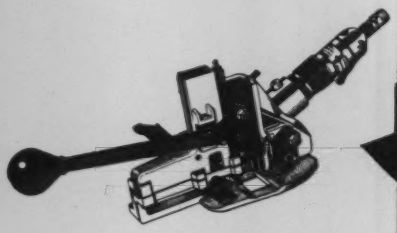
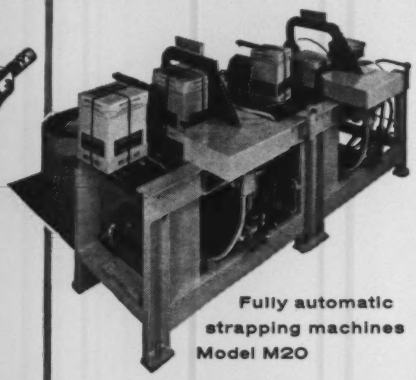
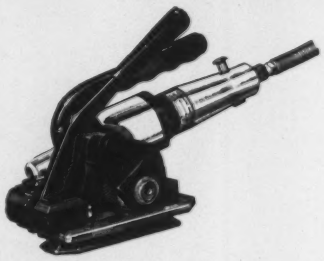


Air power portable strapping machines AP Series

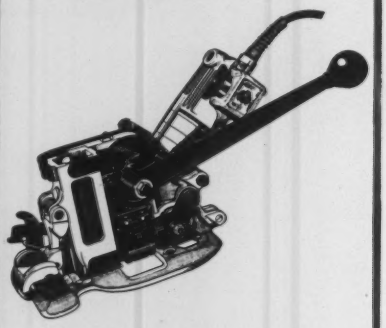


Fully automatic strapping machines Model M20



The first air power feed wheel tensioner for heavy duty strapping FN Series

Pistol grip air power sealers. Model RCNS



Electric portable strapping machines. AE Series

N Series

Heavy-duty air power sealers

9 ways to new savings

Binding things together with steel strapping is a low cost way to eliminate individual handlings, save space, and prevent damage. These nine machines—part of the most complete line of equipment in the steel strapping industry—create new ways to save with strapping. Signode will be glad to help you select the right equipment and devise methods to make the most of it. There's a Signode man near you. Call him today, or write:

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Are Defense Dollars Wasted?

"Make-Work" Projects Plentiful, Congress Told

Fifty pct of defense spending is simply pump-priming, Rep. Whitten charges.

There's too much effort just to "keep everybody happy until after the election," he says. —By G. H. Baker.

▪ There's too much fat in the government's defense program, a congressional committee has been told.

Representative Jamie L. Whitten, (D—Miss.), makes this charge. He insisted, in testimony before a Senate-House committee looking into procurement, that 50 pct of defense spending is only pump-priming.

Money's Worth?—Fifty cents of every defense dollar spent is not buying true defense, but simply providing "make-work" projects, he contends. The Congress and the Pentagon are striving more to "keep everybody happy until the next election," he says, instead of demanding a full dollar's worth of defense for every defense dollar.

Mr. Whitten is a member of the House defense appropriations subcommittee. As such, he is in a strategic position to whittle down the Pentagon's demands for spending money.

Share for All—National defense should be the only consideration in defense spending, he tells the investigators. Instead, it has been almost pushed aside by a Pentagon tendency to "do something" for big business, little business, different geographic areas, and wage earners in all classes.

He names the following as "considerations" in spending our defense dollars: Pump priming, spreading the "benefits" of defense spending, "taking care" of the Army, Navy, and Air Force, and giving defense contractors and geographic areas a "fair share" of the defense budget. Also, generals and admirals tend to demand plush personal facilities they are not entitled to. None of these are valid considerations, he points out.

"We spend far too much for the amount of defense we actually receive," Mr. Whitten insists.

Cut Out the Fat — The alternative, as he sees it, is to cut the fat out of the defense budget and divert these dollars into public works, instead.

He maintains the nation receives far more for its tax dollars from public works than from military contracts.

Keep an eye on Mr. Whitten this year. If he can sell his view to other members of the House military appropriations subcommittee, the House may vote for some major shifts in emphasis within the national budget.

Congress Will Renew Security Program

Legislation empowering the Secretary of Defense to set up an industrial security program replacing the one invalidated by the U.S. Supreme Court is moving quickly through Congress.

The industrial security program covers about 3,000,000 defense plant workers. It is a system for determining who has access to secret information. Procedures must be established to handle cases where such eligibility has been denied or revoked.

The high court ruled 8 to 1 last June that the program then in effect had not been authorized by Congress. The present bill gives Congressional approval to whatever procedure is set up.

Capital Bullish on Business

▪ Strong basic forces still at work will keep business healthy, government experts believe.

Included among these are heavy consumer demand and the rebuilding of steel inventories.

Consumer spending intentions are still high. Personal income continues at healthy levels. There's every reason to believe the demand for new cars, appliances, and home furnishings will be brisk for many months.

Auto Buying Pause—The January slowdown in auto sales will be more than offset by a big buying surge in the second quarter, the Washington experts predict.

It's reasoned that the advent of the compact cars has given car buyers cause to reflect. They should return to the market soon. Any temporary market softness is bound to be of short duration.

Inventory Strength — Rebuilding of inventories, especially steel supplies, is providing the strength for strong production trends in virtually every metalworking industry.

Tight money is still a restraining force in the economy. But government money-managers at the Federal Reserve Board point out costly interest charges have not slowed the volume of borrowing as much as expected.

Harris Model 30 Batch Incinerator

CONTROLS SMOKE AND FUMES

HANDLES 4 AUTO-BODIES AN HOUR ...CONTINUOUS OPERATION:

This first of a complete line of incinerators being engineered and manufactured by Harris is intended to meet the needs of the smaller operations. Its simplicity, overall cost, and flexibility of installation permit purchase of complete factory built unit, or if you prefer, the major and controlling components can be bought separately. This provides an ideal arrangement for the smaller dealer. The exceptionally effective afterburner provided has the capacity to smokelessly burn all combustible matter, except tires, in 4 automobiles per hour at the maximum firing rate of 40 gallons of #2 fuel oil per hour.

SPECIFICATIONS

Kiln size	20′ long x 14′ wide x 10′-8″ high at eave 14′ at gable (3,600 cu. ft.)
Burning time	25 minutes
Hourly capacity	4 automobiles or combustible equivalent
Door openings	11′-0″ x 10′-6″ (10′-8″ above tracks)
Afterburner lining	9″ insulating firebrick, 2,300° F. rating
Stack diameter	36 inches
Stack height	35 ft. above ground
Estimated weight	55,000 pounds

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How to Win Paperwork Battle

Farwest Company Has Cost-Cutting System

Streamlining of record keeping has paid off for the Norair Div. of Northrop Corp.

Some of the benefits: Better records, checks on paperwork costs.—By R. R. Kay.

■ Is your paperwork eating up your profits? Don't despair. You can do something about it. Set up a streamlined records program.

Here are some benefits you can expect: Better records, standard filing, best use of file cabinets, and easier report-making and form filling. There are also extra bonuses: Orderly retirement and destruction of inactive records, safeguards against disaster, checks on paperwork costs, and better measures of productivity.

What to Watch—The Norair Div. of Northrop Corp., Hawthorne, Calif., has such a program going. The company says it's a surefire cost cutter. And it's getting national attention.

Leo Richman, Norair's records management chief, offers some pointers:

Control your forms and reports.

Be sure to cover all the bases: Birth, active life, retirement, and death of every record—whether paper, microfilm, X-ray or tape.

But don't hold on to them far beyond their use and value.

When to Discard—"Except for some fiscal and historical papers, we advise against scheduling any records to be retained indefinitely or permanently," Mr. Richman cautions. "Proper destruction avoids confusion and cuts storage and handling costs."

Control Reports—One way to make big savings is by control of forms and reports. Norair example: A daily production report costs $87.50 to prepare, receive, handle, and evaluate. That's $23,147 per year.

"If such a report could be cancelled, simplified, combined, or go to fewer persons, the cost could be written off entirely. Or greatly reduced," Mr. Richman says.

Paperwork costs keep mushrooming. And managers are getting prematurely gray trying to fight them.

They know they've somehow got to cut these indirect costs. Very often cost control is one of the few advantages they have over their competitors.

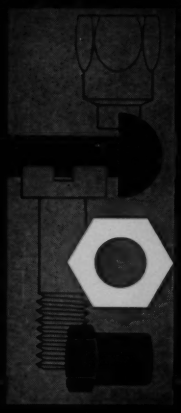
Propulsion Project

Aerojet-General Corp. is ready to begin production of propulsion units for the second-stage of the Minuteman inter-continental ballistic missile.

Dan A. Kimball, president of Aerojet-General, announced the work will be done at the company's Solid Rocket Plant at Sacramento.

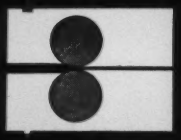
How to Move a Nuclear Reactor

BY PALLET AND TRUCK: Laboratory-type reactor weighing 25,000 lb is moved with large pallets and heavy duty Clark fork truck. Reactor builder is Atomics International Div. of North American Aviation, Inc.



COLD HEADING MACHINERY

Cold Headers • Parts Formers • Nut Formers • Slotters • Threaders • Pointers • Trimmers and other Cold and Hot Forming Equipment



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Two-High and Four-High Mills • Special Mills • Sendzimir Mills • Rod Mills • Slitters • Coilers • Winders • Straighteners • Payoffs • Edgers • Coil Boxes • And Other Mill Equipment

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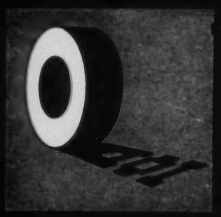

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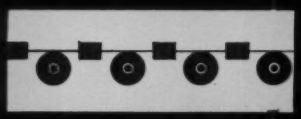
Continuous Tandem And Upright Cone Wire Drawing Machines • Bull Blocks • Wire Flattening Mills •



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WF 51R

AMA Studies Numerical Control

Disappearing Skills Make Growth Inevitable

Experts say half the metalcutting machines in the U. S. will be numerically controlled in five to ten years.

They cite many benefits and warn about some of the pitfalls.—By R. H. Eshelman.

▪ Look for half the country's metalcutting machines to be numerically controlled in five to ten years.

That's what a wide range of experts say. Why? Necessity.

The old timers with great skill and pride of workmanship are fast disappearing. And not enough young machinists are taking their places.

Trend to Machines—The only answer is to turn the job over to the machine. That's what a select manufacturing management group from around the country heard last week. Meeting in the American Management Association's well-planned facilities in Hotel Astor, New York, the men heard plain facts from some of the nation's top experts in the field.

This was AMA's first venture into numerical control. But it won't be the last. Participants were enthusiastic. "This is straight stuff—what I came here for," declared an executive vice president.

Lead Off Man — Herbert P. Grossiman, of Concord Controls, Inc., opened the first session. "In actual dollar value," he said, "discrete (point-to-point) positioning will solve more manufacturing problems than contouring control." Also, it's simpler to get started with two axis machines in your shop, he noted.

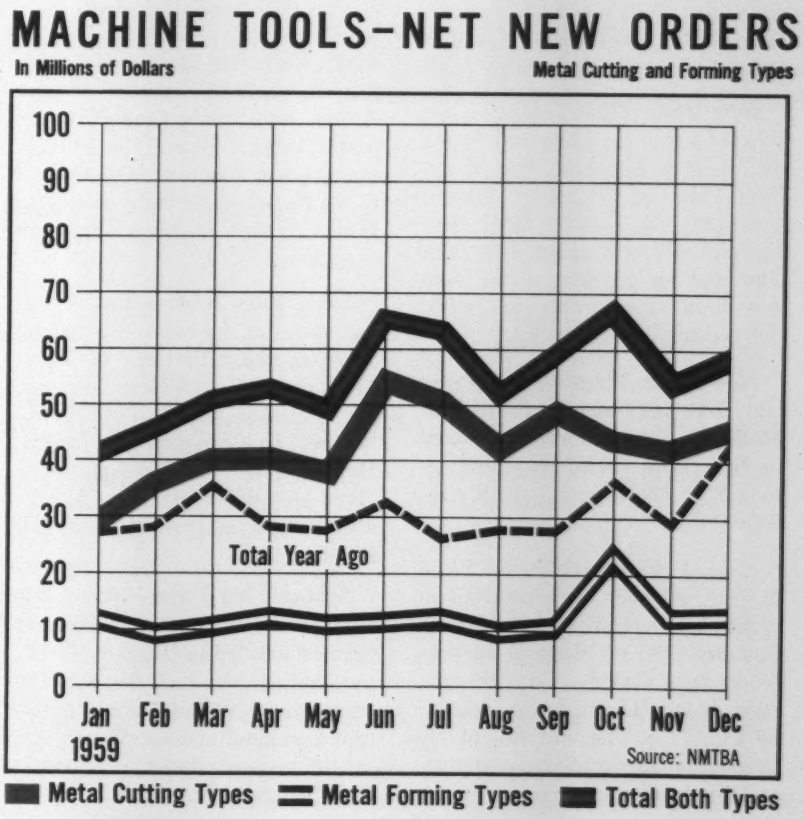
John Morgan, of The Cincinnati Milling Machine Co., said standard tapes and codes are essential because they'll simplify equipment and organization programming and tape preparation.

How It Adds Up—But how do you justify the cost of numerical controlled machines? At last real help is available. Wallace Brainard, chief engineer of Servo Div., Kearney & Trecker Corp., explained a procedure for making detailed estimates.

You can't take just any machinist —even a good one—and expect the new installation to work out, the experts caution. You've got to select someone who can learn new habits. And he should have background in electronics. Above all he must be enthusiastic.

Training Program—Meanwhile, programmers, tape typists, maintenance people must also be carefully selected and trained. Top management must lend active support—even take some training.

Closing the meeting, Harry E. Ankeney, chairman of Giddings & Lewis Machine Tool Co. listed some of the pitfalls of retrofitting (adding numerical control to existing machines).



INDUSTRIAL BRIEFS

Porter Program—About $4 million will be invested in construction and equipment modernization of Refractories Div. plants of H. K. Porter Co., Inc., at Bessemer, Ala. and Wellsville, O. The program is aimed to increase refractory brick production, provide new products, and improve product quality.

Alcoa Signs Lease—The Aluminum Co. of America will have its New York district sales office in Grand Central City. Construction on the new $100 million skyscraper is scheduled to start this spring. The new Alcoa offices will provide quarters for two subsidiaries, Alcoa International, Inc. and Rome Cable Co.

Selling in Japan—Yawata Iron & Steel Co. on the island of Kyushu in Japan has placed an order with the Drever Co., Bethayres, Pa., for a new plate heat treating line. This will be the third line installed in Japan by the Drever Co. It will increase Yawata's plate heat treating capacity to about 1300 tons per day.

New J&L Pits—Contracts for soaking pits at the Cleveland Works of Jones & Laughlin Steel Corp. have been let to Amsler Morton Co., Div. of Textron, Inc. New facilities will cost about $900,000. The soaking pits are of the one-way fired type, ample to handle the present ingot capacity.

Now on the Plaza—The pig iron and coke sales office of Pickands Mather & Co., has been relocated in New York City from Washington, D. C. The address is 30 Rockefeller Plaza.

Capitol Equipment — A liquid oxygen storage and distribution system is in operation at the Capitol Foundry Div. of National Malleable & Steel Castings Co., Phoenix, Ariz. It was designed and installed by Linde Co. The unit will supply oxygen for furnace decarbonization, scrap reduction, and riser removal.

Mag Furnace—A new magnesium heat treat furnace has been installed at Arwood Corp.'s Tilton, N. H. plant. The electrically heated oven has a temperature control capability to within two degrees of any temperature to 1200 degrees F. The furnace uses a sulphur dioxide atmosphere to prevent oxidation.

For Steel in Elizabeth—Fort Duquesne Steel Co., Pittsburgh, has begun operations in its new branch steel distributing plant in Elizabeth, N. J. The company will supply cold rolled, hot rolled, and pre-coated strip and sheet steel.

Kaiser's New Partner — Kaiser Aluminum & Chemical Corp. and Delta Metal Co. Ltd., have formed an aluminum fabricating company in the United Kingdom. To be known as James Booth Aluminium Ltd., the company succeeds James Booth & Co., Ltd., a Delta Metal subsidiary. Kaiser will invest $14 million, half of the initial capitalization.

Albion Muncie Merger—Shareholders of the Albion (Mich.) Malleable Iron Co., and the Muncie (Ind.) Malleable Foundry Co., approved a merger that will boost Albion Malleable's productive capacity about 35 pct. The Muncie foundry will function as a division of the 71-year-old Albion Malleable Iron Co., one of the major auto suppliers.

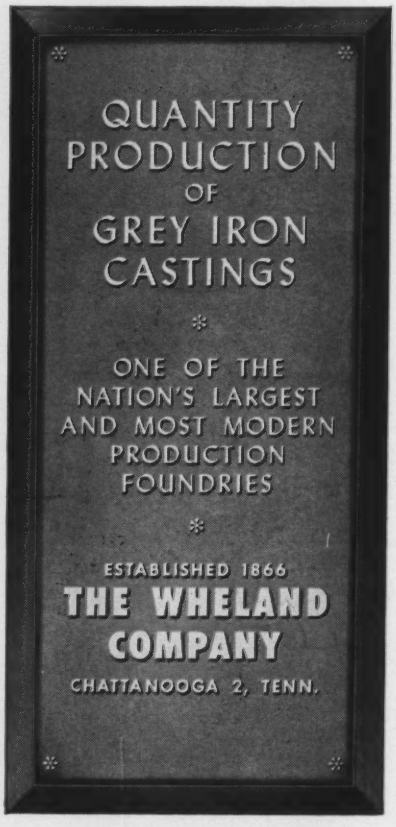
Hupp Buys Jones—Hupp Corp. has acquired, for cash, the manual valve operator business of Jones Machinery Div., Hewitt-Robins, Inc. Purchase includes tooling, inventory and engineering designs. Hupp has moved operations to its Hupp Aviation Div. in Chicago, and is now in production on all standard sizes.

Synthane on Coast—New fabricating and warehouse facilities have been established in Glendale, Calif., by Synthane Corp., Oaks, Pa. The corporation manufactures industrial laminated plastics. West Coast operations are headquartered at 518 Garfield Ave., Glendale.

Cooper Expands—Cooper Alloy Corp. has leased additional plant space in Hillside, N. J., from Ceco Steel Co. This space will be used to store company products. A shipping department will be established to handle the company's valves and fittings.

Recruiter—F. C. Frost has been promoted to the administrative staff of the American Standards Assn. to devote full time to membership development. He was formerly civil engineer in charge, and secretary, of the Construction Standards Board and Materials and Testing Standards Board.

Torrance Project — Automation Industries, Inc., Manhattan Beach, Calif., is building an engineering and production plant adjacent to the Torrance Airport, Torrance, Calif. The facility is expected to be completed by June 1960 and will house the company's Ultrasonics Divisions and corporate offices.



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Hydrofluoric Acid	Ammonium Fluoborate
Sodium Fluoride	Lead Fluoborate
Sodium Bifluoride	Tin Fluoborate
Trisodium Phosphate	Copper Fluoborate
Sodium Metasilicate	Iron Fluoborate
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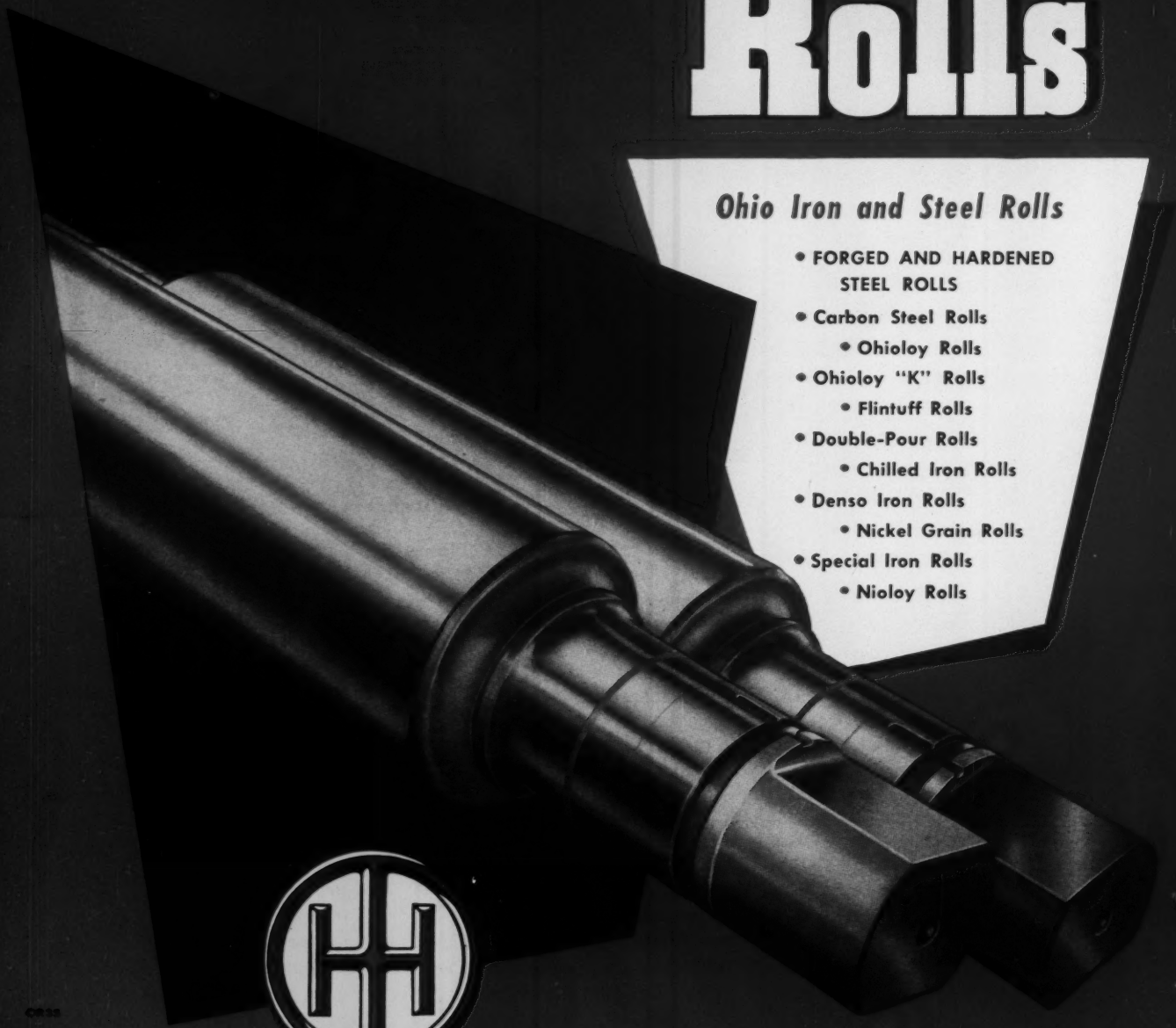
Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY



Ohio Iron and Steel Rolls

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- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Double-Pour Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls

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H. W. Read, elected vice president, marketing, Alan Wood Steel Co., Conshohocken, Pa.

Brad Foote Gear Works, Inc.—**G. E. Gunderson,** elected chairman of the board and chief executive officer; **H. J. Buescher,** elected president.

Buffalo Forge Co.—**T. M. Dillaway,** elected vice president and **G. P. Schivley,** as vice president, manufacturing.

The Ohio Injector Co.—**B. J. Milleville,** elected vice president, engineering and research.

The Beryllium Corp.—**L. F. Boland,** elected executive vice president.

Calumet & Hecla, Inc.—**D. W. Blend,** elected a director and vice president, operations.

Alan Wood Steel Co.—**P. L. Francis,** elected senior vice president.

Illinois Tool Works, Shakeproof Div.—**W. E. Bruse,** promoted to general manager, Elgin, Ill.; **K. C. MacKay,** named plant manager.

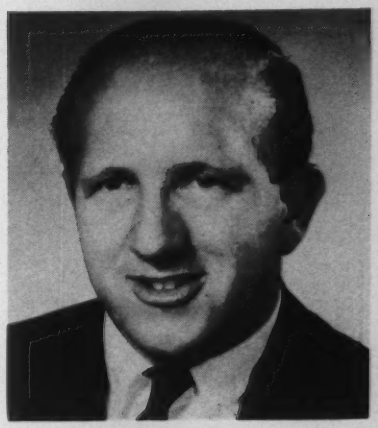
Bethlehem Steel Corp.—**D. W. Baird,** elected treasurer.

Rockwell-Standard Corp. — **M. B. Hammond,** appointed vice president—Bumper Group Sales.

The Baird Machine Co.—**B. F. Lewis,** promoted to vice president, engineering; **F. C. Holmes,** vice president, sales, and **C. P. Foreman,** chief tool engineer; **W. L. Hancock,** promoted to sales manager, Beaver Tractor Div.; **C. B. Bennett,** named sales manager, Barrel Finishing Equipment; **George Chapman,** named sales manager, Presses and Metal Forming Equipment, and **W. D. Bower,** sales manager, Chucking Equipment.

Lincoln Electric Co.—**John Farran,** named director, service, Cleveland.

Pangborn Corp., Vibratory Finishing Div.—**W. E. Brandt,** appointed Division manager.



R. J. Wean, Jr., elected executive vice president, Wean Engineering Co., Inc., Warren, O.

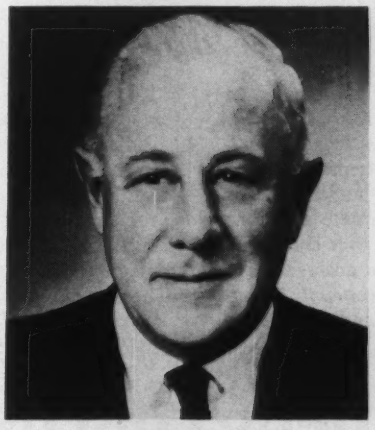
The Warner & Swasey Co.—**H. W. Geyer,** named general superintendent, Cleveland plant; **Peter Rusnov,** named chief industrial engineer.

A. O. Smith Corp., Smith-Erie Div.—**H. D. Leisenring,** named director, marketing, New York headquarters.

The Black & Decker Mfg. Co.—**G. H. Treslar,** appointed general sales manager, Industrial-Automo-

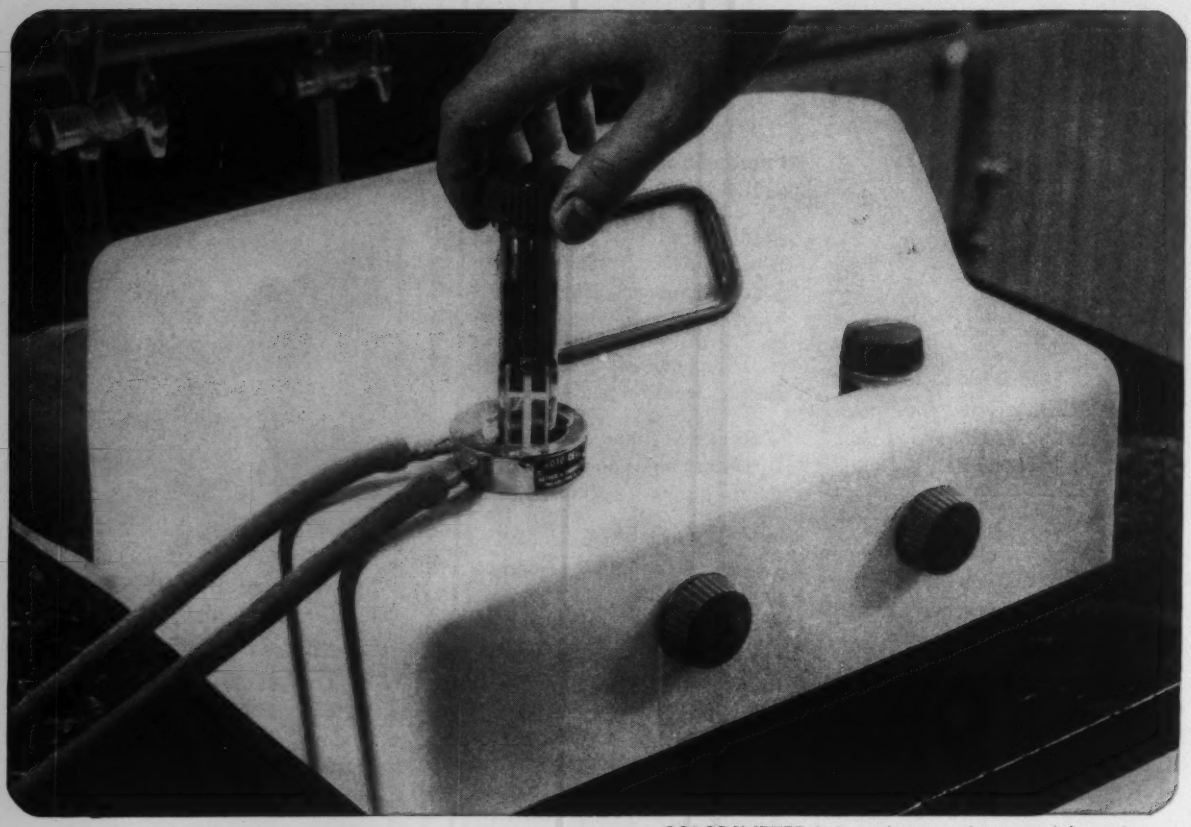
(Continued on P. 135)

Miss H. A. Moran, elected vice-president and asst. secretary, Wean Engineering Co., Inc., Warren, O.



H. W. Lynn, elected vice president, sales, Wean Engineering Co., Inc., Warren, O.

D. A. McArthur, elected vice president, engineering, Wean Engineering Co., Inc., Warren, O.



COLORIMETER (inherently extremely accurate) determines percentages of molybdenum, tungsten, cobalt and manganese in A-L tool steel to insure consistent, high quality.

Colorimeter measures exact chemical composition of Allegheny Ludlum tool steel melts

Accurate adjustment of alloys guarantees uniform heat treatment, predictable dimensional changes, reduced grinding, standardized machining operations.

Close control of molybdenum, tungsten, cobalt and manganese is at the heart of a good tool steel melt. In addition to the usual testing methods, Allegheny Ludlum's chemical laboratory checks these metals with Colorimetry because of its inherent, extreme accuracy.

On the basis of the Colorimeter's findings, it is possible to make carefully calculated furnace additions of ferro-alloys, insuring precise control over chemistry. This guarantees your receiving the *exact* analysis order after order, providing *uniformity of heat treatment, predictable dimensional changes, reduced grinding and standardized machining operations.*

Colorimetry is but one step toward careful control over composition. Allegheny Ludlum also sets exacting purchasing specifications on raw materials and scrap. Quality Control checks all incoming orders to see that they conform with these specifications. Another guard toward your getting your exact specifications: each ingot bears a metal tab showing heat number.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest A-L representative; you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

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ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country... Check the yellow pages

every grade of tool steel... every help in using it

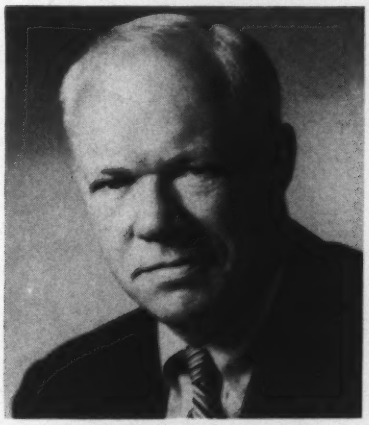
(Continued from P. 133)

tive Div.; **M. D. Mooers,** appointed general sales manager, Hardware Div.; **J. H. Schmidt, Jr.,** appointed director, marketing services; **J. P. Spain,** becomes general manager, Product Service Div.

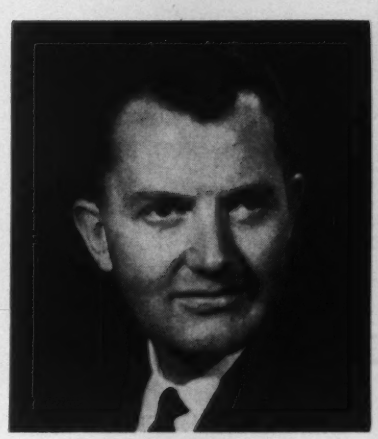
M. J. Perrin, promoted to vice president, Hartford Machine Screw Co., Div. of Standard Screw Co., Hartford, Conn.

Revere Copper & Brass Inc.—**J. S. Fidler,** elected treasurer and asst. secretary; **W. F. Collins,** elected secretary; **William Pearson,** elected asst. secretary and asst. treasurer.

General Electric Co.—**H. F. DeLong,** appointed general manager, Metallurgical Products Dept., with plants in Detroit and Edmore, Mich.



J. F. Miller, elected vice president, Hartford Machine Screw Co., Div. of Standard Screw Co., Hartford, Conn.



C. W. Finkl, elected vice president, operations and engineering, A. Finkl & Sons Co., Chicago.

Electric Steel Foundry Co., Construction Equipment Div.—**N. T. Grubb,** appointed manager.

Jones & Laughlin Steel Corp., Stainless and Strip Div. — **J. R. Pumphrey,** named product manager-Stainless Strip, Sales Dept.

Union Carbide Metals Co., Marketing Research Div.—**R. L. Pope,** appointed manager.

E. H. Schlaudt, elected vice president and asst. treasurer, Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Armco Steel Corp., Armco Div. —**J. G. Wikoff,** named manager, carbon steel products and **A. D. Sechrist,** will be asst. manager; **William Jones,** named manager, magnetic steel products, and **R. G.**

(Continued on P. 138)

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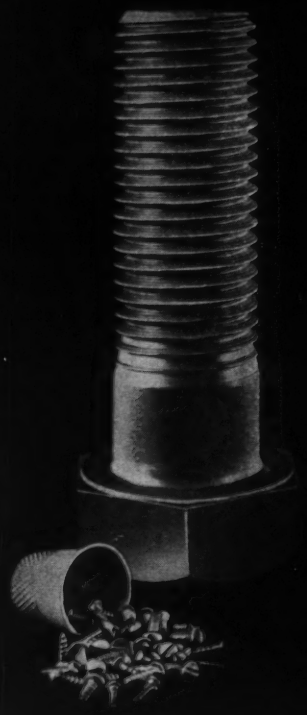

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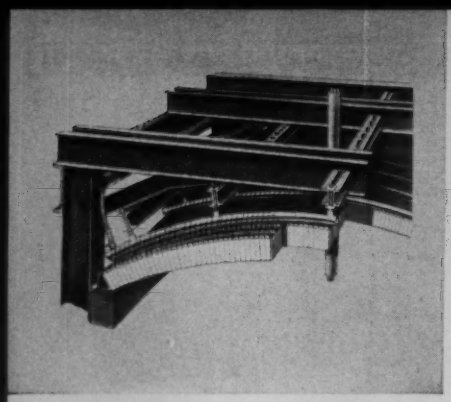
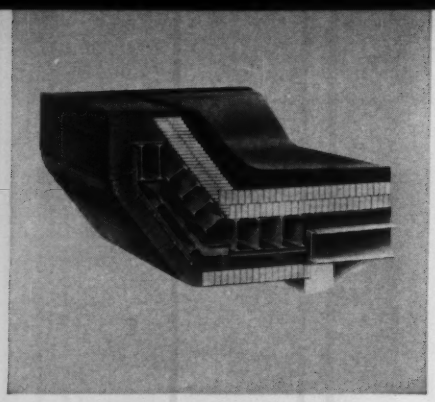
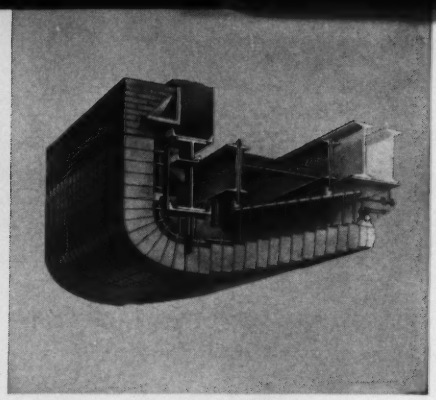






❶ HELD-UP, HELD-DOWN ROOF

- No roof centers to install.
- Easily hot-patched—Brick layers do entire job. No welding, no cutting.
- Pipe-supported—No special supporting members required.
- Inexpensive hangers—Simple, one-piece wire.
- Standard wedge brick—Wider bearing surfaces. More stability.

❷ INTERCHANGEABLE SUSPENDED CHILL WALL

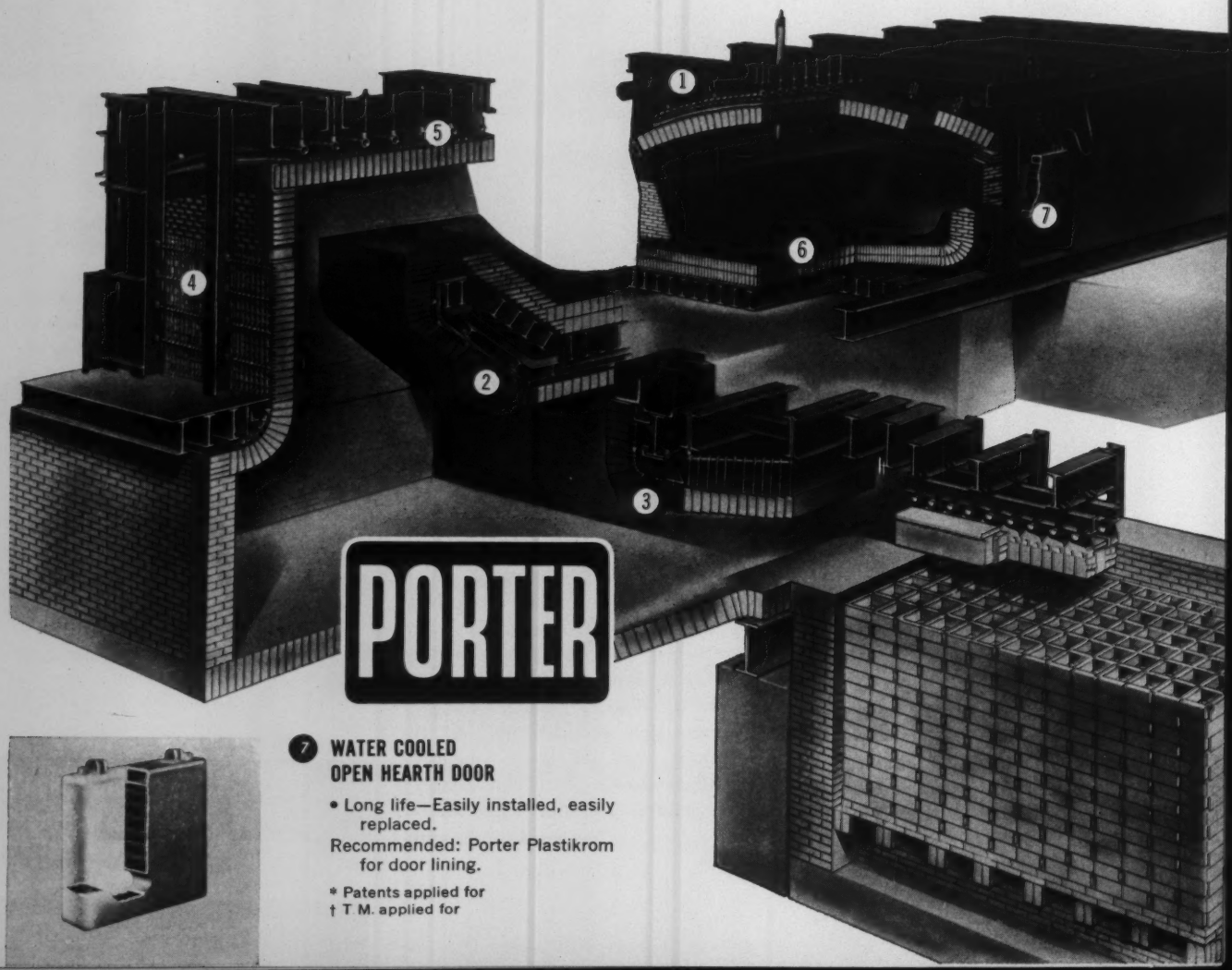
- Low cost, simple installation—Adaptable supporting structure.
- Greater expansion flexibility—Tile engaged on bed joints.
- Safe load distribution—Self-supporting castings.
- Tightly sealed joints—Tongue-and-groove clay tile.

Brick recommended: Either MC-70 Cladex or interchange with Peerlac, 60% alumina.

❸ INTERCHANGEABLE FAN TAIL

- Pipe-supported—Easily replaced with standard mill supply stock.
- Low-cost, simple installation—Adaptable supporting structure.
- Greatest strength—Fabricated steel nose supports.
- Higher heat resistance—Alloy hangers.
- Tightly sealed joints—Tongue-and-groove clay tile.

Brick recommended: Either MC-70 Cladex or interchange with Peerlac, 60% alumina.



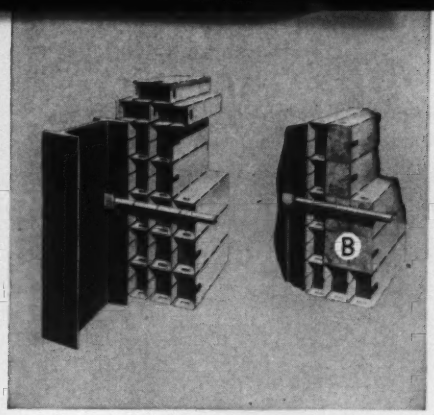
PORTER

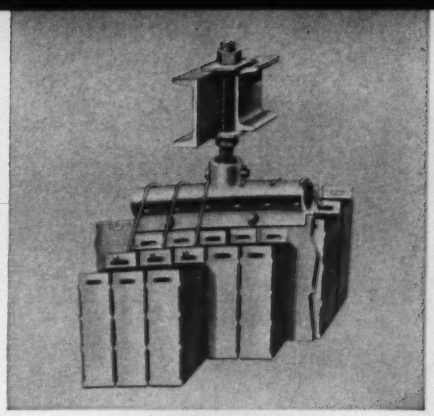
❼ WATER COOLED OPEN HEARTH DOOR

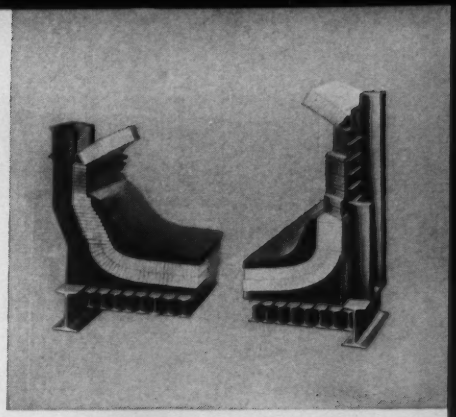
- Long life—Easily installed, easily replaced.

Recommended: Porter Plastikrom for door lining.

* Patents applied for
† T. M. applied for







4 ENDWALL CONSTRUCTION

- Air-cooled tabs (4 sides of brick)—More heat conduction for more efficient cooling.
- Refractory reinforcement for hot spots—Extended casings* permit adding refractory material on cold face (B) as hot face wears.
- Cladding with Porter Cladex†—Dimpled construction of casings provide mechanical spacing for expansion.
- Basic strength—Porter construction eliminates need for tie plates.
- Ties and pipe easily reclaimed.
- Simple one-piece hangers—Wall can be dismantled without cutting or burning.

Brick recommended: MC-70 Cladex or other specified chrome and magnesite compositions.

5 AIR CLEANED, AIR COOLED*, TAB SUPPORTED ROOF BRICK

- Built-in air cleaning—Covers entire roof. No hand blowing.
- Controlled cooling over any area—for controlled wear.
- Tab support—Simple, inexpensive.
- Air-cooled tabs—More heat conduction for more efficient cooling.
- Positive support—Tie plate anchored to pipe.
- Inexpensive hangers—Simple, one-piece wire.
- Notched tie plates—Slip into place. Easily installed or replaced.

Roof brick recommended: CM-40R Cladex or other specified chrome and magnesite compositions.

6 HEARTH CONSTRUCTION

- Monolithic subhearth—Formed by Subhearth Kromform. Easy to install. Perfect conformation.

Brick recommended for inverted arch bottom: Porter M-90B, or other specified chrome and magnesite compositions.

Ramming mix recommended for working bottom: Porter Magnaram 95 for highest MgO content. Or Magnaram 85.

Brick recommended for back wall: MC-70 Cladex. Also other burned and unburned chrome and magnesite compositions.

Brick recommended for front wall: MC-70 Cladex in standard and special jamb brick. Also available burned or unburned chrome and magnesite compositions.

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both suspension and refractories by Porter

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Up to 80″ outside diameter at 1 DP
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Up to 100″ outside diameter at 1½ DP
Up to 125″ outside diameter at 2 DP

Face widths up to 42″, depending on helix angle.

Take advantage of this new capacity, and our long experience as specialists in this field. Send your specifications, drawings or plans — or tell us about your power transmission problem. Our technical staff will promptly consider your requirements and render recommendations and quotations.

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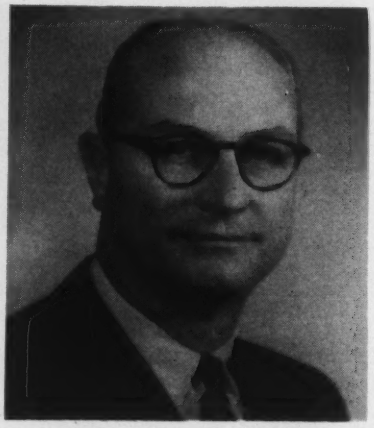
(Continued from P. 135)

Sloan, Jr., will be asst. manager; **J. P. Butterfield,** appointed manager, stainless steel products, and **S. P. Watkins,** becomes asst. manager.

E. T. Hewitt, appointed vice president, ESCO International Div., Electric Steel Foundry Co.



A. L. Pontius, named vice president, operations, Product Divisions, Illinois Tool Works.

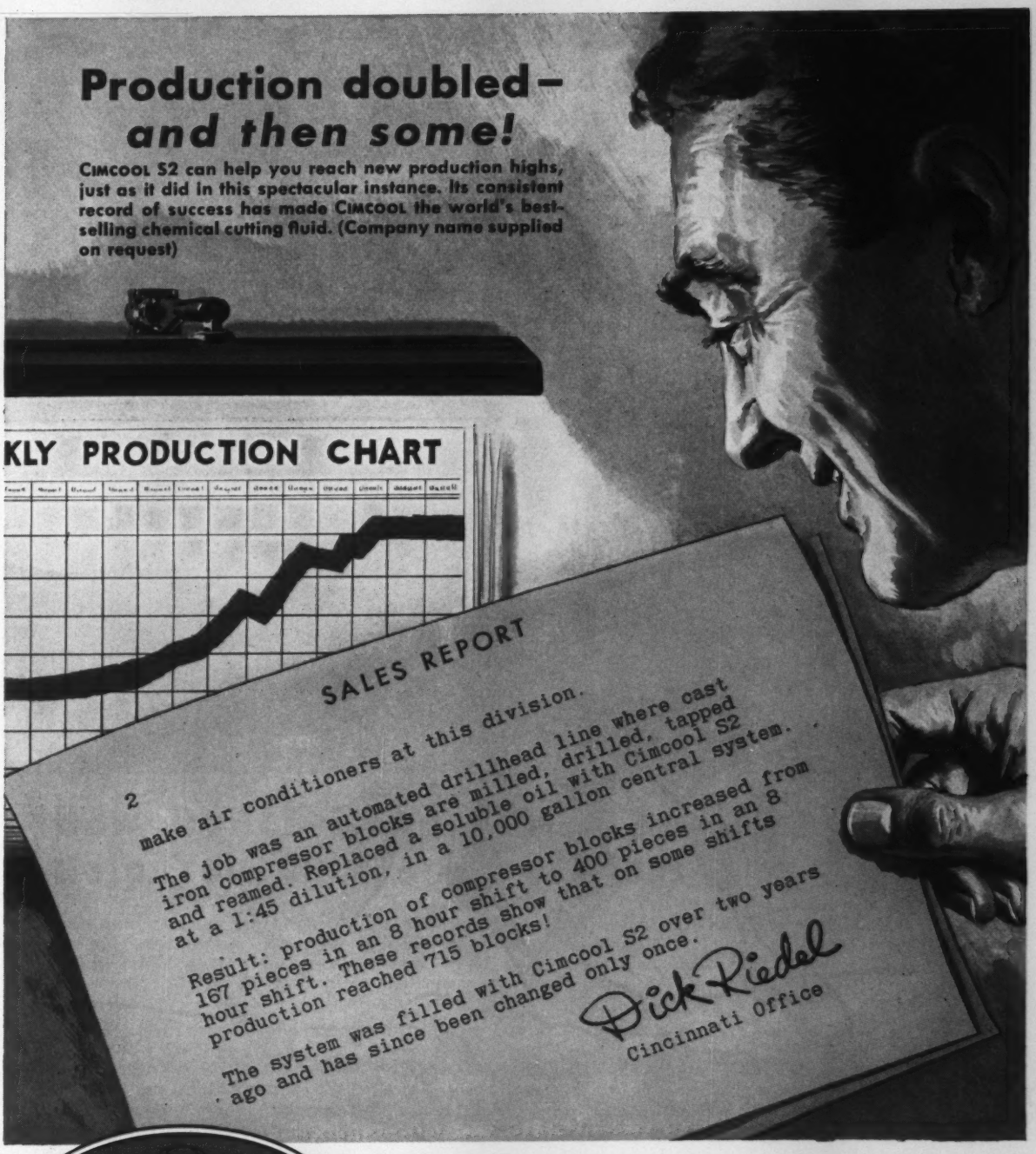
U. S. Steel Corp.—**J. D. Peters** and **S. T. Johnson,** appointed asst. directors, purchases; **J. G. Hepler,** named asst. to the vice president, purchases.

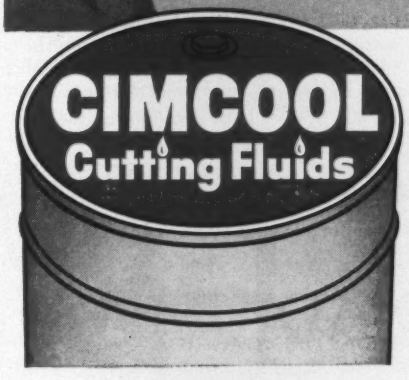
Sylvania Electric Products Inc. —**J. M. Smith,** appointed plant manager, Warren, Pa., wire operations.

Allis-Chalmers Mfg. Co.—**W. E. Korsan,** appointed asst. manager and **P. W. Clark,** appointed manager, sales, Industrial Systems Dept.

Production doubled— *and then some!*

CIMCOOL S2 can help you reach new production highs, just as it did in this spectacular instance. Its consistent record of success has made CIMCOOL the world's best-selling chemical cutting fluid. (Company name supplied on request)


KLY PRODUCTION CHART
SALES REPORT
2
make air conditioners at this division.
The job was an automated drillhead line where cast iron compressor blocks are milled, drilled, tapped and reamed. Replaced a soluble oil with Cimcool S2 at a 1:45 dilution, in a 10,000 gallon central system.
Result: production of compressor blocks increased from 167 pieces in an 8 hour shift to 400 pieces in an 8 hour shift. These records show that on some shifts production reached 715 blocks!
The system was filled with Cimcool S2 over two years ago and has since been changed only once.
Dick Riedel
Cincinnati Office



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CIMCOOL S2 Concentrate — The pink fluid which covers 85% of all metal cutting jobs.
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ALSO — CIMCOOL Tapping Compound — CIMCOOL Bactericide — CIMCOOL Machine Cleaner.

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Improve
hot-working characteristics... *with Vancoram Grainal Alloys*

That's not all these versatile alloys will do for wrought stainless and heat-resisting steels. They minimize heat-checking of castings, reduce conditioning operations, and further lower costs by cutting rejections. Grainal acts as an intensifier for hardening boron-containing constructional steels and helps protect both low- and high-alloy steels against internal and external rupturing in many hot-forming operations. And it promotes uniformity from heat to heat.

Find out more about these useful alloys by writing for your copy of "Grainal and Its Uses," or by calling the nearest VCA District Office. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y.
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VANADIUM
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Producers of alloys, metals and chemicals

Removing risers from these big, unwieldy aluminum castings is a fast, low-cost job with the DoALL Zephyr band machine. Cuts are made in seconds safely and with fine finish here at the Ross Pattern & Foundry Development Co. of Sidney, Ohio.

How DoALL Band Saws Can Help You Cut Foundry Costs

Whether your castings are large or small, simple or complex, ferrous or nonferrous, DoALL has the equipment and the experience to save you both time and money.

For example, Ross Pattern & Foundry Development Co. uses a DoALL Zephyr band machine with a ⅝", 3-pitch blade to cut 2" x 4" risers from these 20" x 48" castings of 108 aluminum. And note the accessibility band sawing offers.

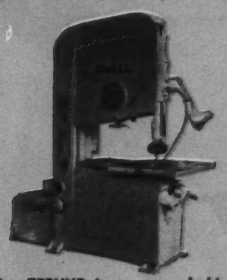
Foundries all over America are using DoALL band machines to cut off gates, risers and flash. These versatile machines also handle many other money-making jobs: slitting, slotting, splitting, notching, beveling, etc. Results: lower production costs, faster deliveries.

DoALL band machines and blades are designed to work together as a high-production team. And they're distributed by a single source that guarantees service and results.

Your nearby DoALL Sawing Specialist understands foundry problems. His experience and the services of the DoALL Research Laboratory are yours for the asking—free. Call your DoALL store today.

B-59

Assisting on this job was Meredith L. Cline of DoALL Dayton Co. He is one of over 200 DoALL Sawing Specialists ready to help foundries achieve higher production at lower costs. Their expert help is free.



The ZEPHYR is a rugged, high-tool velocity sawing machine for production cutting of nonferrous materials and friction sawing.

The UTILITY MACHINE is a low-cost, versatile band saw for general shop use.

DoALL SAW Bands—to saw every metal and material. Over 300 width-pitch-set combinations; 18 styles in both carbon and high-speed steel . . . also file bands, grinding bands and polishing bands. The DoALL friction saw blade is the finest the industry has ever produced!

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The DoALL Company, Des Plaines, Illinois

Some of the 150 Foxboro Dynalog Recorders used at Rocketdyne's Propulsion Field Laboratory. During each test, these instruments log critical items of information with split-second timing and exacting accuracy.

where accurate, dependable records are a MUST

ROCKETDYNE looks to DYNALOG* Electronic Recorders

Test-firing is a vital function at Rocketdyne, a division of North American Aviation, Inc. Rocketdyne manufactures liquid propellant rocket engines for the Army's Redstone and Jupiter missiles; the Air Force Atlas and Thor.

Critical data on engine thrust, temperature, valve operation, and many other performance characteristics are recorded by a remote battery of 150 Dynalog Electronic Recorders.

For furnace temperatures, too, Dynalogs provide highly accurate within $\pm 1/4\%$ of full scale, one second pen sweep, high input impedance. And because Dynalogs have no slidewire, Rocketdyne finds their maintenance problems practically eliminated. They prefer circular charts also, for faster, easier analysis of each measured variable after a test firing.

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Practical Lower-Cost Process Diffuses Chromium Into Steel

Here's a new inexpensive process for chromium diffusion that will fit right into the production line.

Besides giving a stainless surface, steels so treated have good formability and weldability, and high wear resistance.

▪ After seven years of heavy-duty service and 500,000 engine miles, a specially treated truck muffler is still in serviceable condition. Tested under extreme conditions, the muffler outlasted several tractors.

The key to this startling performance is the special surface imparted to the muffler by a new, low-cost, chromium diffusion process now made commercially available. Called Alphatizing, the process was developed by Alloy Surfaces Co., Inc., Wilmington, Del.

Attempts by others to diffuse chromium into steel have met with varying degrees of success over the years. The methods included: volatilizing of chromium itself; freeing chromium from salt baths, surrounding the work pieces with finely divided powder mixture; using a porous ceramic material. But all these techniques have shortcomings.

Creates an Alloy—According to Alloy Surfaces, the new process diffuses chromium into the base metal and creates a metallurgical alloy. Since it produces an alloy and not a coating, there is no bonding involved—and no bonding problems such as peeling.

The term Alphatizing was chosen because of the well-known metallurgical fact that chromium in iron stabilizes the "alpha" or room temperature crystalline form of iron.

This process for chromium diffusion supplies an adequate and controllable amount of chromium to the metal surfaces being treated. Thus, the speed of the reaction is based not on the supply of chromium, but on diffusion rates, temperatures, time, and the metal itself.

A Practical Method—How does the process work? It is similar in many respects to gas nitriding or carburizing; and it involves no special or expensive equipment.

Chromium diffusion can be a complex chemical phenomenon. But in Alphatizing, the total chemistry has been built into one essential process material called Alphalloy.

The procedure calls for placing Alphalloy into the treating vessel along with the metal articles; the process material and the workpieces need not touch.

The action of the heat on the process materials automatically produces the proper atmosphere—in-

QUENCHES PARTS: After Alphatizing in simple rotary furnace, parts can be core-hardened when discharged into oil quench tank.

cluding purging of the sealed vessel.

Re-Uses the Compound—After the reaction, the articles take only a water rinse; and the Alphalloy is stored for re-use in the next heat.

The geometry of the metal articles to be treated dictates the equipment used. In general, normal heat-treating furnaces and accessories can be used.

Thus, slightly modified rotary carburizing furnaces can Alphatize small parts in bulk where individual handling would be inconvenient. Massive parts should be treated in large box-type furnaces or car bottom furnaces.

The quality control equipment and tools needed are those found in any metal working facility. An additional requirement is an automatic device for controlling Alphalloy efficiency.

Depends on Time—What are the characteristics of Alphatized steel? Case depth varies with time and temperature of the treatment, and the chemistry of the metal being treated.

The graph makes this point. There is the normal decrease in chromium content as the distance from the surface increases. But the diffusion rate slows down at about 12 pct chromium. It is at this point that chromium transforms austenite into alpha iron ferrite; and the diffusion rate of chromium in austenite is slower than in ferrite.

Low carbon steels (less than 0.1 pct C) easily attain a ductile case anywhere from 0.001-0.01 in. thick. Thicker (more than ⅛ in.) cross-sections of low-carbon steel, or medium and high-carbon steel in any cross-section, develops a chromium diffused case to a maximum of 0.002 in.

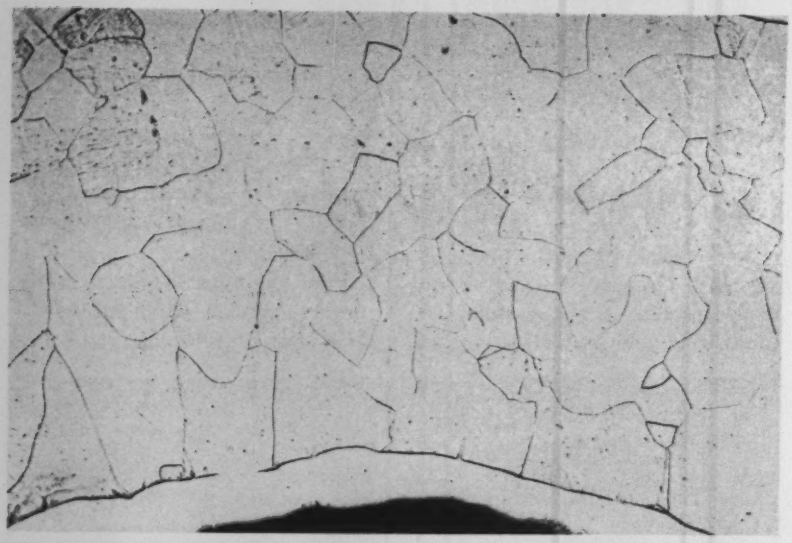
The diffusion rate of chromium into nonferrous alloys may be faster or slower than into iron or steel. For example, chromium diffuses quite deeply into copper but only to a shallow depth into nickel or molybdenum under time and temperature conditions considered normal for steel.

Carbon Ups Hardness — Case hardness increases with the carbon content and section thickness of the steel treated. This holds except for carbon stabilized steels.

For example, an SAE 1010 steel in ½ in. section thicknesses will develop a shallow, hard (in excess of 60 Rc) case. High-carbon steels in any thickness greater than 0.020 in. will develop a very hard (76 Rc) case.

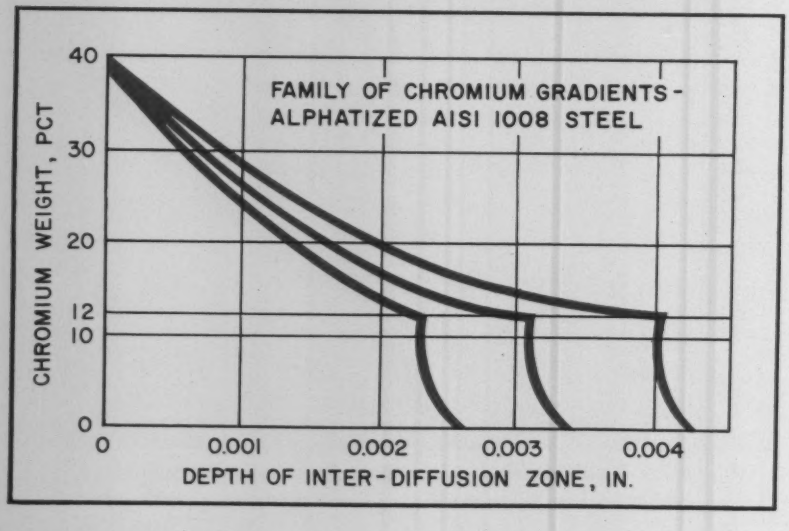
Whenever a ductile case is formed, the weldability is excellent. Spot and seam welding do not disrupt case continuity; nor does welding with a stainless steel rod. However, flashbutt welding is not recommended.

Case is Uniform — Alphatizing develops a uniform chromium-rich case. The bottoms of threads, holes, and even small surfaces are penetrated and treated. Also, the high mobility of the Alphatizing gases



UNAFFECTED BY BENDING: Micrograph of steel sample, taken at apex of 180° bend, over ⅛ in. radius, shows no breakdown in case continuity.

Time Affects Diffusion Depth



makes complete masking extremely difficult even when desired.

Alphatized low-carbon steels in thin cross-sections, and carbon stabilized steels in all section thicknesses show excellent corrosion resistance by virtue of the high chromium content at the surface.

Alloy Surfaces reports that these Alphatized steels are superior to all conventional 400 series stainless steels since the latter have a much lower chromium content.

Wear Resistant—Carbide surfacing by the new process produces the following advantages over standard heat treating procedures: higher case hardness; improved corrosion resistance; lower coefficient of sliding friction; lower tendency to pick up lacquers and galling metals.

Alphatized high-carbon steels are particularly effective in combatting sliding or rolling-type wear in situations where corrosion also contributes to tooling failure.

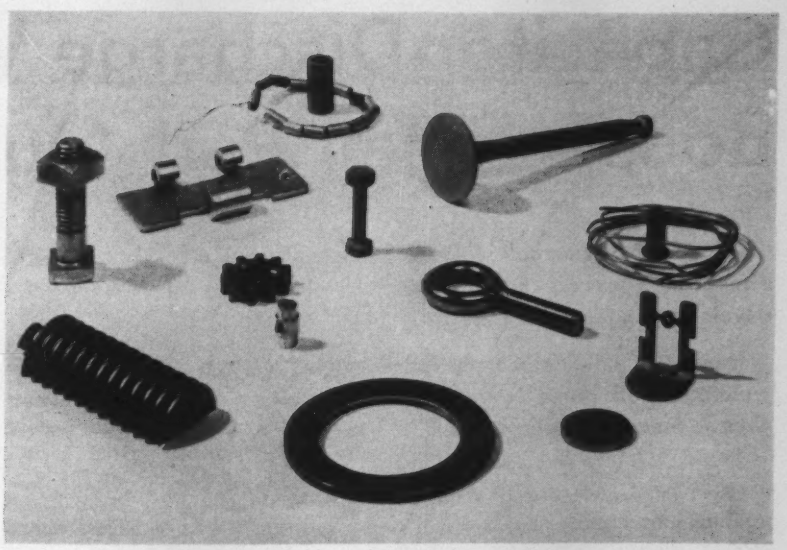
The very hard chromium carbide case does not respond to heat treatment of any kind; thus it is relatively immune to softening by heating that may occur in service conditions.

Generally, the steel core underlying the chromium carbide case should be heat treated to as high a hardness as possible to support the extremely hard carbide case. This assures that heavy localized pressure in service will not dent or cause fatigue failure in the base metal.

Shows Annealed Core—Alphatized low-carbon steel (less than 0.1 pct carbon) in sections thinner than ⅛ in. will slow an annealed and decarburized core structure. The ferrite grain size will be large.

As a result of the new process, low-carbon steels will change dimensions in the growth direction —of about one-half the case depth. Thus, a 1 in. OD round part, Alphatized to a depth of 0.003 in. on all surfaces, will show an OD of about 1.003 in. after treatment.

In the case of medium and high-carbon steels, the growth is more nearly two-thirds of the case depth. And, if the steel is to be subsequently core-hardened, you must consider the growth due to the formation of martensite and any distortion that may occur during the hardening process.



TREATS MANY TYPES: The Alphatizing process imparts a corrosion and wear resistant surface to large variety of parts.

Resists Heat—Alphatized steels show excellent resistance to heat scaling up to 1500°F for at least 1000 hr. Process modifications in special cases permit good short term oxidation resistance of many metals and alloys up to 2000°F.

How about formability? As long as a ductile chromium-diffused case exists, Alphatized steel can be formed.

In the case of sheet metal, you can easily make right angle bends with a radius equal to the gage thickness without breakdown of case continuity.

Case Holds Up—Also, ½ in. thick Alphatized steel plate made from carbon stabilized steel can be bent 180° over a ¾ in. radius without damage to the case. Treated metal can also be blanked and drawn into shapes such as shallow dishes.

Alphatizing need not be restricted to steels. A number of other high melting point metals, such as molybdenum, and nickel and cobalt-base alloys, show improved properties after treatment.

This is very significant to oxidation and cracking resistance at elevated temperatures in atmospheres containing sulphur or agents that promote intergranular attack.

Serves in Many Fields—One of the present big uses for Alphatized steel is for truck mufflers. They are fabricated by the usual techniques —at a lower cost than those made from stainless steel sheet.

There are many other applications for the new process. Chromium diffused parts are very well adapted for heaters because of their oxidation resistance. Moreover, the non-seizing nature of mating Alphatizing terminal fasteners permits easy replacement of broken lead wires.

Alphatizing is also well suited for such diverse uses as in jet engines, heat exchangers, canning equipment and ovens.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Capacitor-Discharge Welding Boosts Small Part Output

Capacitor-discharge welding discourages excess heat from developing in the weld zone.

Here's a new machine for welding small parts in volume, even in meager power areas.

▪ Don't shy away from difficult welding jobs just because available service lines can't furnish the needed power. Here's a new welding machine that might very well be the tool you're looking for.

A high volume mass production unit, it's capable of turning out 500 welds per minute. The machine handles coated metals, dissimilar materials and even delicate parts. The process is capacitor-discharge welding.

The unit is a product of Weldex Div. of The Metal Craft Co., Detroit. It produces 100,000-amp plus pulses of about one millisecond duration. Yet, no added service lines are required.

Success Stories — Several companies have already put these new "spike power" welders through the test. One of them is being used by a stamping manufacturer to weld two pieces of 0.020-in. copper-plated steel without damaging the copper plate.

This same company is a supplier of one of the larger auto makers. Thanks to the new machine, the company is turning out over 1000 of these assemblies per hour. On a hand loaded basis, too.

Another unit was shipped to an automotive decorative trim manufacturer. Until then this company had a problem welding three 0.020-in. Type 430 stainless clips onto a decorative part of the same material and thickness.

The weld was just one problem. The company wanted to keep buffing costs down, too, through a minimum of marking. In this case, the welder was a special six-gun type. It's now welding successfully at the rate of 255 pairs of complete assemblies per hour.

SHORT-TIME POWER: Capacitor-discharge method develops large power action in a short time. It generates little heat in the weld zone.

Not Enough Power? — A third customer is welding aluminum. The main problem had been one of power availability. This company only had 400-amp service. Without any additional power requirements, this plant now uses the new setup to weld its prescribed pair of 0.062-in. aluminum pieces together.

Capacitor-discharge welding does have some advantages over conventional resistance welding. The former, for example, can feed great amounts of power through the work in a very short time.

This advantage generates less heat in the weld zone. And the low duty cycle of the welding transformer spells greater power handling capabilities.

Faster Pulse — Most capacitor-discharge units to date require a second or so for the capacitor to charge. That means that the welder can only operate at the slow rate of one pulse every second.

"Spike" welding overcomes this disadvantage by arranging its capacitors in such a way to give 120

pulses of short duration current every second.

These power pulses last about one millisecond each which gives a rise time through the transformer at a frequency of about 500 to 600 cycles. The short times permit the transformer to handle much greater peak power than possible on straight 60 cycles. The line demand is correspondingly low.

Standard Controls — The short duration of the current pulses also results in far less heat generation in the weld zone. The time factor dispels heat from spreading throughout the work.

A heat or phase shift control is a standard part on all of the Weldex units. It permits easy adjustment of welding current whenever critical jobs arise.

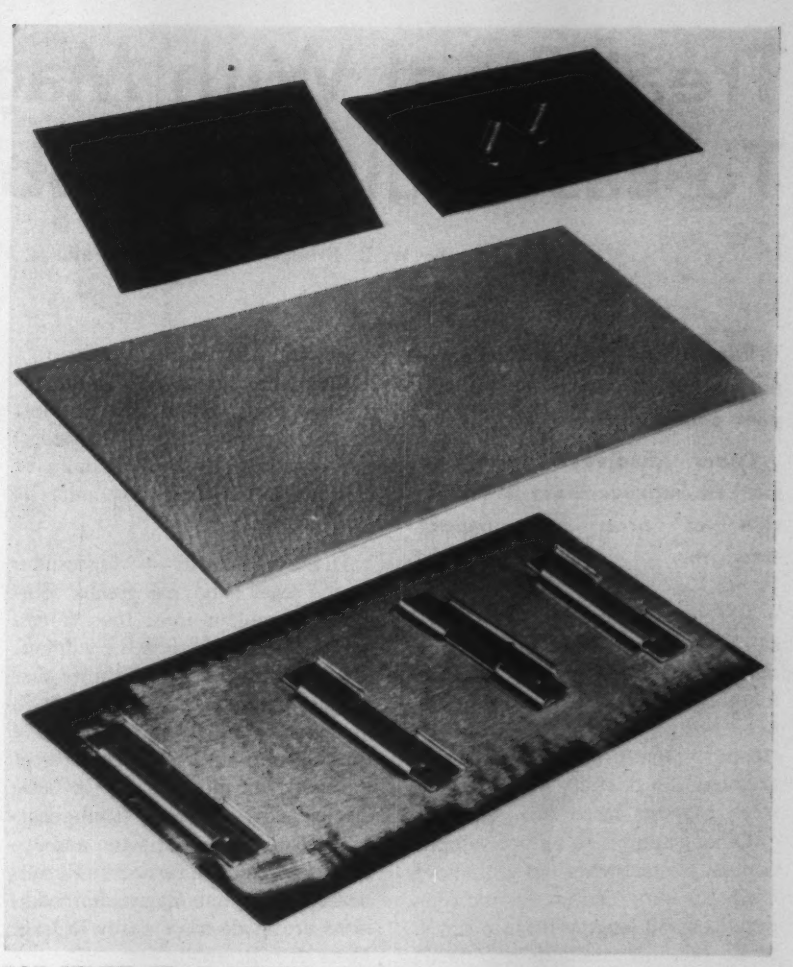
Each Weldex unit contains standard electronic "spike power" controls made by Robotron, Inc., Detroit.

For the Vinyl Clad—Successful welds have already been made on vinyl-clad steel and lacquer-coated steel. The unit can weld studs, brackets and clips to such materials without damaging or discoloring the coating. Production capacity can be maintained at 500 pieces per minute. Chrome-plated and nonferrous metals can be welded, too.

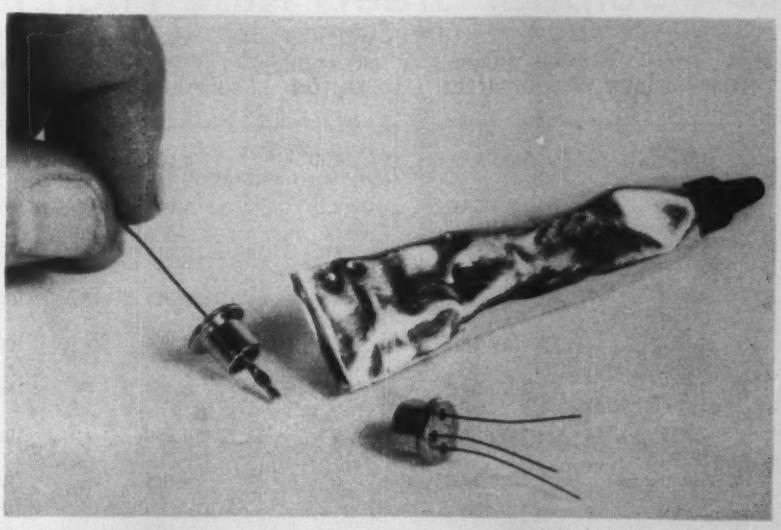
The Weldex unit will pass qualification tests in welding pieces of ⅛-in. aluminum stock. This feat normally requires 200-kva welders. Such power is not available to every area. Even if it is, a transformer must be adjacent to the welder.

Weldex engineers feel that a tenfold power reduction will bring qualification welding of aluminum within grasp of plants in areas of low power availability. And it's also a boon to plants that can't afford to invest too heavily in large welders of restricted use.

Excessive heat from conventional welding techniques spelled rejects for one transistor manufacturer. Scrap soared to 20 and even 30 pct. With its new capacitor-discharge unit, this company has just about eliminated the scrap problem in joining transistor cases to bases.



FOR VINYL-CLAD STEELS: "Spike power" setup welds studs, slips and brackets to vinyl-clad steel without any damage to the plastic. Many of these parts can be welded at rates of 500 pieces per minute.



JOINS DELICATE PARTS: Transistors, diodes and pharmaceutical containers can be successfully joined with the new welding equipment.

Treat Steel With Magnesium To Ease Sulphur Problem

By W. B. Brooks, A. C. Doumas, and B. W. Romefelt—The Dow Chemical Co.

Recent studies show that magnesium effectively reduces sulphur content in steels.

Other findings point up marked improvements in reduction of area and impact strength.

▪ Recent development work on desulphurization of steel with magnesium promises to give once-hoped-for properties for many steel products. Moreover, rapid reduction of sulphur in the furnace, coupled with excellent hot ductility of the treated steel, suggests large savings.

Other attempts to reduce sulphur content of steels over the years have used calcium, cerium, exotic slag practices and lengthy furnace times. Some of these methods are partly successful but, where heat time is important, they are expensive.

Calcium, based on thermodynamics alone, should be a most effective desulphurizer. However, the very low, if any, solubility of calcium in molten iron limits its effectiveness.

Dissolves Easily — Magnesium, on the other hand, has greater solubility in molten iron; thus it can act more directly upon the sulphur.

Dow's research work shows that magnesium powder, diluted with lime, can be quietly and successfully injected into steel. Though most of the work was done in 500-lb basic electric arc furnaces, trial heats have also been run in 5-ton and 20-ton basic electric furnaces. Results demonstrate that magnesium additions are made more easily in large heats than in small.

Treatment of steel with up to 5-lb of magnesium per ton of steel gives rapid sulphur reductions; no elaborate slag practices are necessary.

Two Limitations—In fact, it appears that there are only two limiting factors for furnace treatment: treatment must be performed in a basic unit; and the steel must be thoroughly deoxidized and the slag low in iron oxide before magnesium injection.

Over a hundred 500-lb heats have been made to date. It appears that about 50-80 pct of the sulphur in the bath before treatment is removed by use of 2.5-5.0 lb of magnesium per ton of steel.

The second table contains a partial listing of data which point up the effect of magnesium. In general, starting with a fairly low (0.020-0.030 pct) sulphur content, consis-

Low-Sulphur Steels Rate High in Properties

HEAT NUMBER	GRADE OF STEEL	MG ADDN. LB/TON	SULPHUR, PCT	REDN. OF AREA, (2250° F), PCT	AS-CAST, −20° F, 45° CHARPY IMPACT, FT-LB
10158	1020 SAE	4.5	0.008	99.0	29.5
10191	1020 SAE	2.5	0.009	99.0	26.5
10225	1020 SAE	5	0.010	100.0	29.5
10226	1020 SAE	5	0.010	100.0	—
10227	1020 SAE	5	0.009	100.0	—
10232	1020 SAE	5	0.005	98.7	—
10255	1020 SAE	5	0.006	100.0	—
10157 (untreated)	1020 SAE	0	0.015	23.8	16.0
10177 (untreated)	1020 SAE	0	0.019	51.2	21.5
10181 (untreated)	1020 SAE	0	0.018	40.5	18.0

Magnesium Lowers Sulphur Content

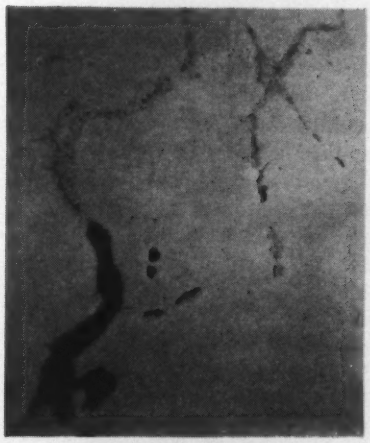
HEAT NUMBER	SIZE	GRADE OF STEEL	MG ADDN., LB/TON	BATH SULPHUR, PCT	FINAL SULPHUR, PCT
Commercial foundry heat	2 ton	1025 SAE	2.9	0.026	0.005
10158	500 lb	1020 SAE	4.5	0.019	0.008
10191	500 lb	1020 SAE	2.5	0.027	0.009
10232	500 lb	1020 SAE	5	0.016	0.005
10235	500 lb	310 Stainless	2.5	0.015	0.004
10255	500 lb	1020 SAE	5	0.012	0.006
10258	500 lb	1020 SAE	5	0.011	0.005
10311	500 lb	4340 AISI	5	0.017	0.009
Commercial foundry heat	2 ton	1025 SAE	2.5	0.020	0.004

tent reductions to levels below 0.009 pct sulphur are obtained.

Physical conditions make the magnesium additions more effective in larger furnaces. One foundry reports getting 0.003 pct sulphur regularly.

Reduces Hot Tearing—The primary objective of reduced sulphur content is the reduction of hot tearing during solidification and during the hot working of wrought steel products.

What happens is that the sulphide material reaches the surface by grain boundary migration. There it reacts with oxygen to form a low-melting eutectic which is prone to tearing.



SHOWS HOT TEAR: Steels not treated with magnesium have lower hot-ductility properties. Sulphide at head of tear tells the story.

The micrograph shows a specimen of steel which had not been treated with magnesium. At the head of the tear in the untreated specimen is some low-melting oxy-sulphide eutectic.

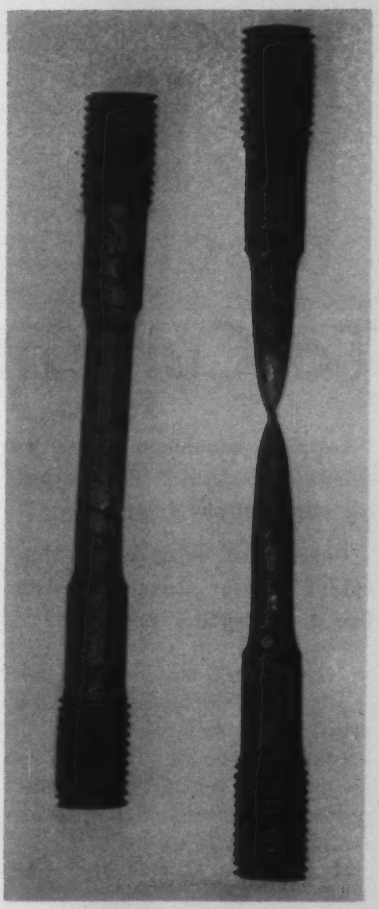
Properties Improve—A study of elevated temperature properties points up the benefits of magnesium treated steels. Data in the first table show a startling improvement in hot-ductility properties of magnesium-treated steels.

The photograph shows an untreated tensile specimen which had almost no reduction in area at fracture (2250°F) as compared to a treated specimen which exhibited 100 pct reduction in area under similar conditions.

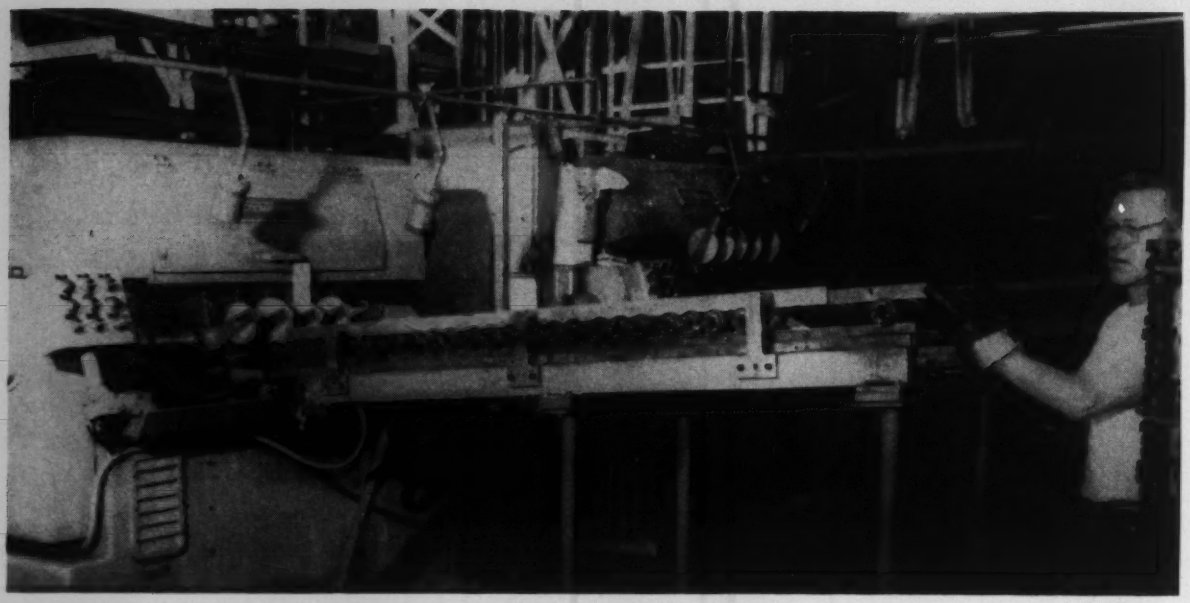
Furthermore, as-cast Charpy impact data also show improvement in the toughness of the treated steel. They reveal that magnesium treated steels have double the impact value of untreated steels.

To Study Other Areas — Additional work calls for studies into transverse properties, treatment of other alloy steels, and expansion into larger furnaces and ladles.

It is fair to say that work to date has yielded enough significant results to justify intensified interest into an expanded effort. Who knows what economies will result from super low sulphurs?



IMPROVES PROPERTIES: Specimen on left, of untreated 1020 steel, shows almost no reduction in area. After treatment with magnesium, specimen on right displays 100 pct reduction in area. Test temperature was 2250°F.



GRAVITY FEEDS: A worker loads camshafts on a chute set at a slight incline. Gravity feeds the parts to the lapping machine. The chute holds a total of 30 camshafts and extends into the lapping machine.

Smooth Links Blend New Machine To Current Production Line

Lapping machines enter an existing production line to polish auto camshaft journals.

Parts pass through the machines without disrupting established production schedules.

▪ Introducing a machine tool into a job shop is relatively easy. But, introducing a new machine into an existing production line can be tough. The newcomer often creates problems in scheduling, parts transfer and materials handling.

The Buick - Oldsmobile - Pontiac Div. of General Motors Corp., Lansing, Mich., decided to use lapping machines to polish camshaft journals for automobile engines. Previously, this work was done on lathes equipped with polishing fixtures.

Oldsmobile's engineers faced the problems squarely. They had to design connecting links to integrate the lapping machines into the production line. Their goal: To have parts proceed through the new machines with as little handling as possible.

Smooth Polish—Before the camshafts reach the lapping machines, they are finish ground. They also have a coating of iron and manganese-phosphate. The coating, on the cam lobes, acts as a lubricating agent for the valve lifters during the engine break-in period. However, five journals on each camshaft must be polished to a fine finish.

After the camshafts are coated, they are ready for polishing. An overhead conveyor brings them to the polishing area. Because of the volume involved, two lapping machines are needed. Each machine, built by the Schraner Div. of Foote-Burt Co., Cleveland, O., polishes up to 163 parts per hour.

The camshaft journals have diameters ranging from 1.9972 to 1.9980 in. as they enter the lapping machines. Surface roughness is about 25 rms. Polishing removes a maximum of 0.0003 in. as the surface is finished to about 10 rms. The polishing operations remove only a portion of the coating from the journals. They leave enough of the coating to smooth the remainder into a fine finish.

Gravity Helps—Gravity feeds the camshafts into the machines. Oldsmobile installed a chute in front of each machine. Each chute holds 30 camshafts at a time. A slight incline causes the parts to roll to the foot of the chute. Stops prevent them from falling out.

The foot of each chute extends into one of the lapping machines. When the machine's transfer device moves upward, it picks a camshaft off the chute; then moves it to the polishing machine's headstock and tailstock. Polishing takes place between the centers.

A roll of abrasive cloth, mounted on each machine, polishes the camshaft journals. Each abrasive roll is 150-ft long. It does about 1200 parts. Fresh cloth feeds into the lapping heads, at regular intervals, as the heads move away from the finished journals.

Careful Loading — From the racks on the overhead conveyor, a worker removes the camshafts. He places them in the two gravity feed chutes.

After polishing, the camshafts are washed. They move to the washing machine on a belt conveyor.

Oldsmobile's engineers had to design a way to prevent camshafts from one polishing machine from falling on top of camshafts already on the conveyor. If the parts strike each other, they can damage the ground surfaces or polished journals.

Tracks and an escapement apparatus take the polished parts from each machine. They deliver the parts, one at a time, to the conveyor.

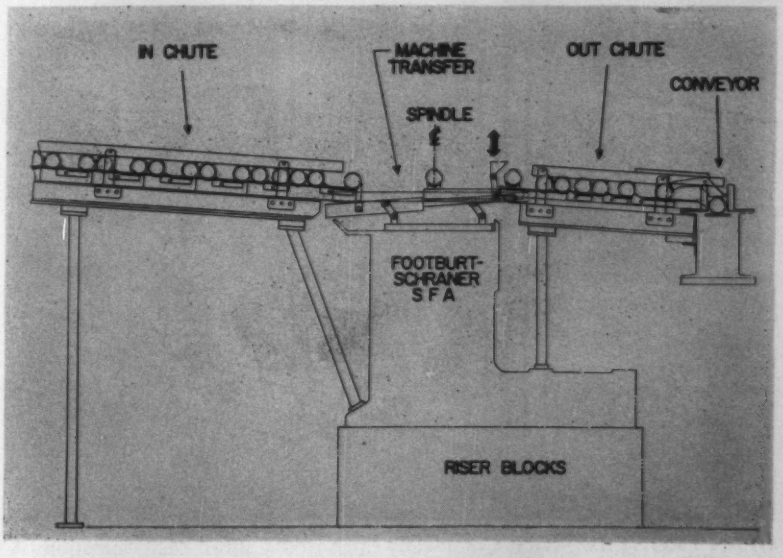
Protects Finish—Two V-blocks on the transfer unit pick up the finished camshafts from between the working centers. The part then moves to the back of the machine.

If there's no camshaft on the conveyor at the point of discharge, the escapement allows the part to roll down the tracks onto the conveyor. When it reaches the conveyor, the escapement rides on top of the finished camshaft. This prevents another part from rolling down the tracks.

If, for some reason, the conveyor stops and no parts are discharged, the camshafts remain on the tracks inside the machine. When the parts fill the tracks, a limit switch stops the machine.

GRAVITY EXIT CHUTE: Rolls of abrasive cloth polish the camshaft journals. Then, V-blocks on a transfer device move back to pick up the polished part. The blocks deposit the part on an exit chute.

How Integration Takes Place



PARTS FLOW THROUGH: A beam transfer picks up the camshafts and places them between working centers. An escapement discharges the parts.

Creep Tests Check New Alloys

Compact Creep-Rupture Machines Save Valuable Lab Space

Materials undergo a lot of distortion at high temperatures while under heavy loads.

A new line of compact creep testers helps to develop alloys that withstand space age use.

▪ Supersonic aircraft and missiles require materials that safely withstand high temperatures. Assemblies and parts both experience high internal stresses as temperatures and applied forces climb. Magnitude of the internal stresses must be known or accurately predicted.

At U. S. Steel's Applied Research Laboratory, Monroeville, Pa., batteries of creep rupture testers check the pedigrees of steel alloys at high temperatures. Creep tests provide valuable data. Using test results at both guides and controls, U. S. Steel develops alloys to withstand stress and strain at elevated temperatures.

Long Time Tests—Many creep tests require 10,000 hours or more to obtain results. Thus, it's evident that a lab needs quite a few creep machines to evaluate several alloys. A new unit fills this need.

A compact creep tester, made by Arcweld Mfg. Co., Grove City, Pa., requires limited floor space. It's important with space always at a premium in any lab. And, since creep tests require a battery of machines, there's quite a floor space problem.

Valuable Space — Mr. R. M. Brady, in charge of the Creep Section at U. S. Steel's Monroeville Lab, played an important part in the choice of unique creep testers for his company's fellowship at an independent research institute.

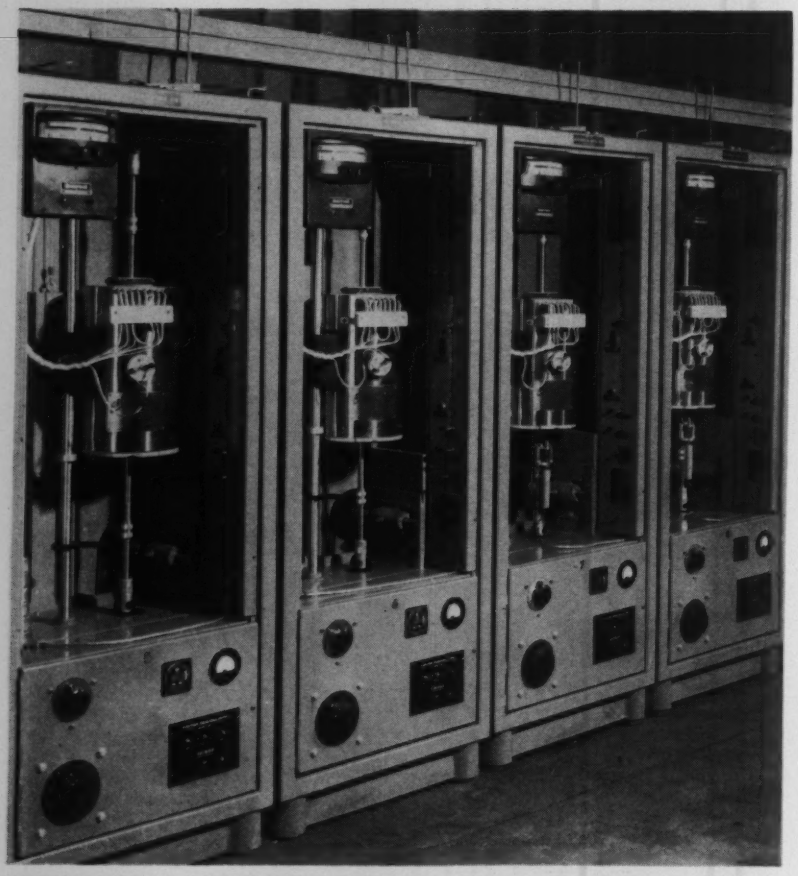
"These machine are very compact units," explained Mr. Brady. "Each one uses only 4 sq ft of floor space. This is a very important point to help get the maximum use of a valuable working area."

Two rows of Arcweld M-3 machines, set back-to-back, use only 338 sq ft. It's estimated that an equal number of competitive models need twice as much floor space. This is because the competitive models are larger—and they must be loaded from the rear.

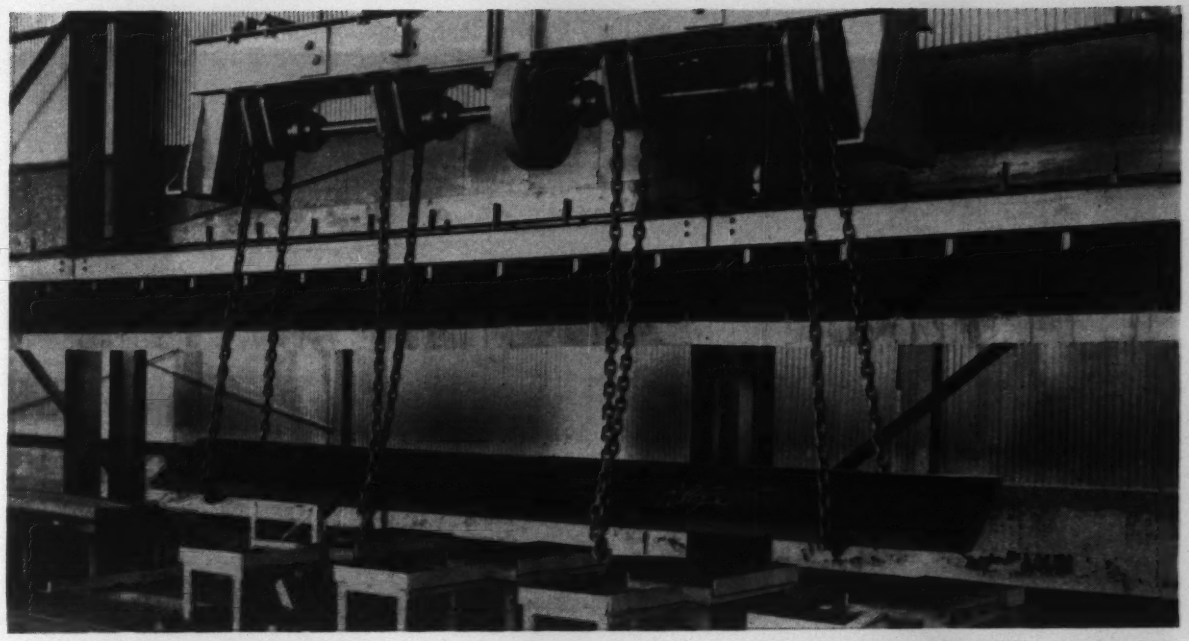
Open Fronts—The M-3 testers have open fronts. This affords quick, easy loading. Their counterbalanced lever systems provide a 16 to 1 ratio. Thus, any weight placed on the machine's weight pan is multiplied sixteen times; then read as the force applied to the test sample.

A counterbalanced furnace, located in each machine, heats samples up to 2200°F.

The M-3 creep testers have a maximum capacity of 6000 lb. Applied forces, calculated in terms of pounds per square inch, depend upon the cross-sectional area of the test samples.



OPEN FRONT DESIGN: Completely open fronts afford easy operation. A technician applies weights from the front—with little motion lost. The counterbalanced furnace moves up or down with finger tip control.



UP AND OVER: An upright surface has been ground. Using the turnover device, an operator repositions the stainless steel slab on the working tables—or between tables—to allow grinding of all surfaces.

Turnover Device Handles Slabs

A mobile unit places heavy stainless steel slabs on special split working tables.

After an upright surface is ground, the unit turns and positions the slab to speed surface grinding operations.

▪ A motorized slab handling unit readily positions huge stainless steel slabs. It turns the slabs to allow grinding of all surfaces. After grinding operations remove surface imperfections, the slabs are rolled into coils of stainless steel.

The slab turnover unit, installed at the Empire-Reeves Steel Corp., Mansfield, O., has a capacity of 25,000 lb.

Quick Turnover—Designed and built by the Materials Handling Div. of Heppenstall Co., New Brighton, Pa., the device consists of a double-burden bar that supports heavy, endless chain slings. Motorized equipment activates the chains.

Four chains, each with a capacity of 12,500 lb, are available to pick up a slab. Either the two center chains, or the outer pair, go under the slab ends. Two chains hang without load.

Two of the chains, on 6-ft centers, handle slabs less than 14-ft long. The other pair of chains, 14 ft apart, manipulate longer slabs. The turnover device handles slabs up to 50-in. wide.

A crane operator controls slab turning from his cab. He raises, lowers and turns the slabs with ease.

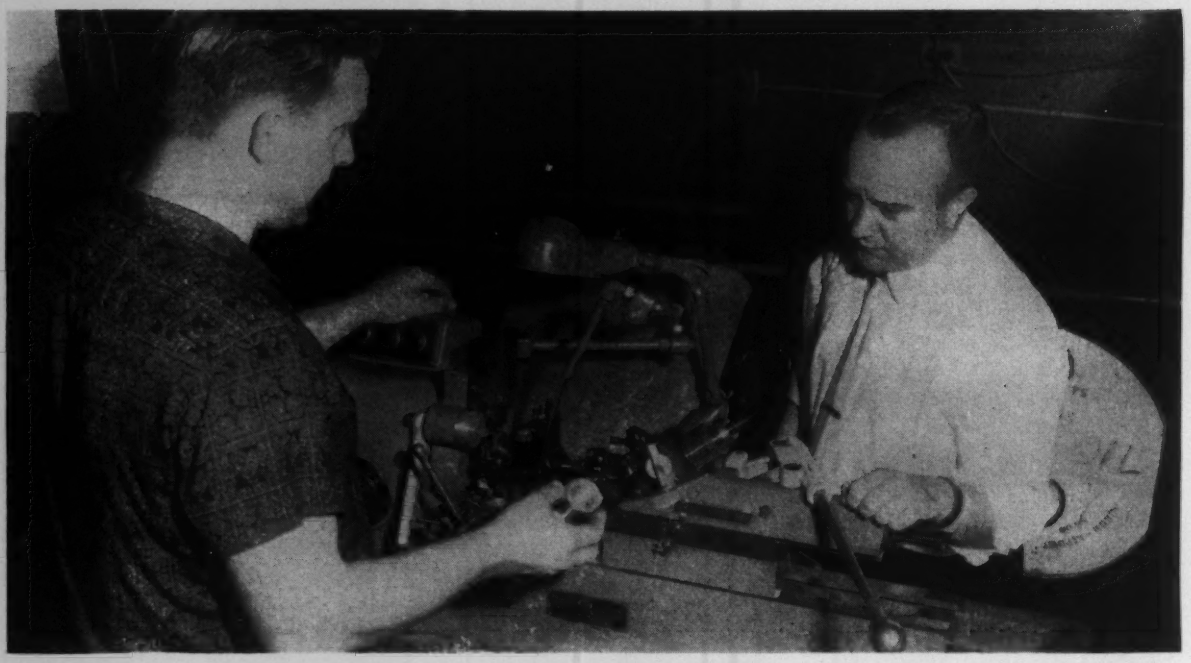
Internal Drive—The motor drive is housed within the burden bar. It operates a gear reducer. The reducer turns the main drive shaft at a predetermined slow speed.

Chain wheels are keyed to the drive shaft. These wheels provide a positive drive for the chain slings. This allows operation through 360°.

For grinding, the crane operator lowers the slab until it rests flat on a series of split tables. The chains are removed. The operator then moves the turnover device out of the way.

Up on Edge—After the surface is ground, the turnover unit quickly places the opposite surface in the grinding position. For grinding of the slab edges, the device turns the slab edgewise and lowers it between the split tables. Finish hand grinding takes place on another set of supports.

After all the grinding operations are completed, the slab moves into the strip mill. There, the turnover unit lowers the slab to a conveyor, where the chains are again removed. The unit is now ready to pick up another slab in the slab mill.



DOUBLE DUTY: Electric-clutch lathe at Ace Electronics takes over both roughing and finishing on job formerly requiring two separate lathes. The new setup reduces the rejection rate by 30 pct.

Electromagnetic Clutches Give Fast, Easy Lathe Control

For machining critical small parts, a new hand turret lathe boosts its overall efficiency through compact electromagnetic clutch control.

▪ Key to versatility and precision of a new line of small hand turret lathes is a compact electromagnetic clutch. It gives the drive system of the units instantaneous control and reliable, maintenance-free operation.

Made by Wade Tool Co., Waltham, Mass., the lathes permit manufacturers of such products as fine tools, testing instruments and electronic components, to cut production times and costs and to hold precision tolerances.

The drive system of each lathe incorporates four clutches—Electro-Clutch units made by I-T-E Circuit Breaker Co., Philadelphia. The clutches start, stop, change speed, reverse and brake the main lathe spindle.

Simplifies Control — Electrical operation in these units brings simplicity to control. They may be actuated either by pushbuttons or by automatic control.

The lathe motor runs at a constant speed in one direction only. Speed variation is provided by variable-pitch pulleys.

Clutches have a high and low range of speeds for each setting of the variable-pitch pulleys. Control of pulley relationships and clutches provides a range of speeds from 140 to 3500 rpm forward and from 350 to 1750 rpm in reverse.

The positive, instantaneous response of the clutches to their electrical controls insures accuracy of speed and torque. Time lag and slippage of mechanical clutch systems are eliminated.

Compact Size — Another attractive feature of the lathe is its compactness, affording space savings and ease of installation. The compact size of the four clutches helps make this possible.

The clutches weigh from 1½ to 2½ lb each. The largest measures 3.74 in. diam by 1.43 in. long.

Despite small size, this type of electric clutch has a torque rating of 36 lb-ft. It's a smaller unit than

mechanical clutches with the same torque-carrying capacity.

One Does Job of Two—One user of the electric-clutch lathe, Ace Electronics Associates, Somerville, Mass., gets improvement in both production efficiency and product quality. The company, makers of such parts as potentiometer cases, shafts and bushings, previously used two conventional lathes.

One lathe roughed out the first heavy cut, and the second was used for precision finishing. But the new lathe carries out both roughing and finishing in a single continuous operation.

There's a savings in production time of one third over the two-lathe method. At the same time, the new setup has reduced the rejection rate by 30 pct.

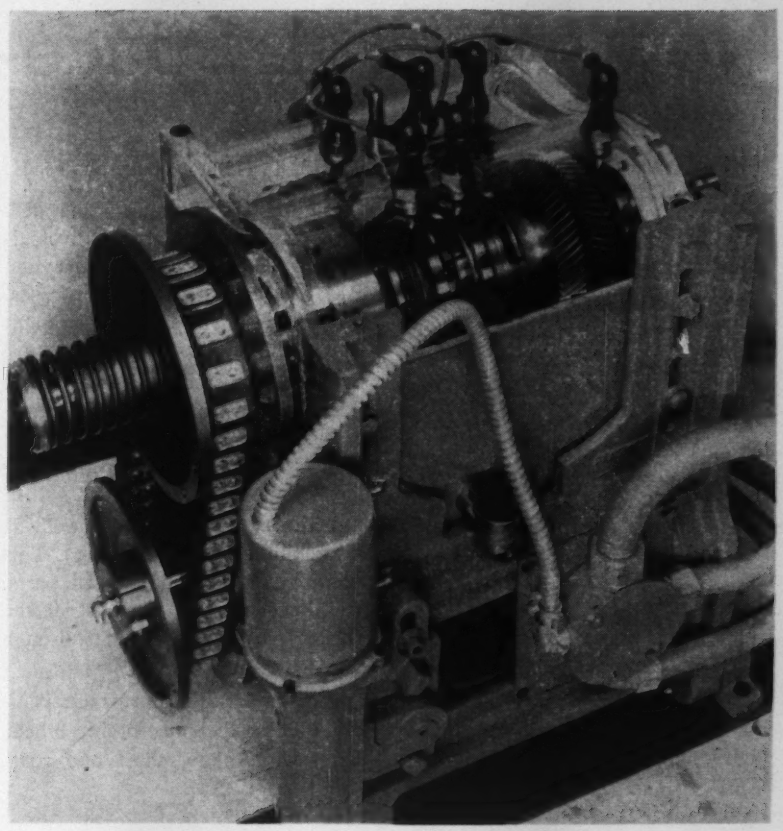
Stress Accuracy — Another user of the electric-clutch lathe is the Gremar Mfg. Co., Wakefield, Mass., a producer of radio frequency connectors. With 16 of the Wade units, Gremar produces parts of such fine tolerances that inspection requires a bench comparator that gages screw threads so small they cannot be felt by touch.

Subjected to constant work loads, the clutches remain trouble-free. They have no linkage or levers to wear or require adjustment.

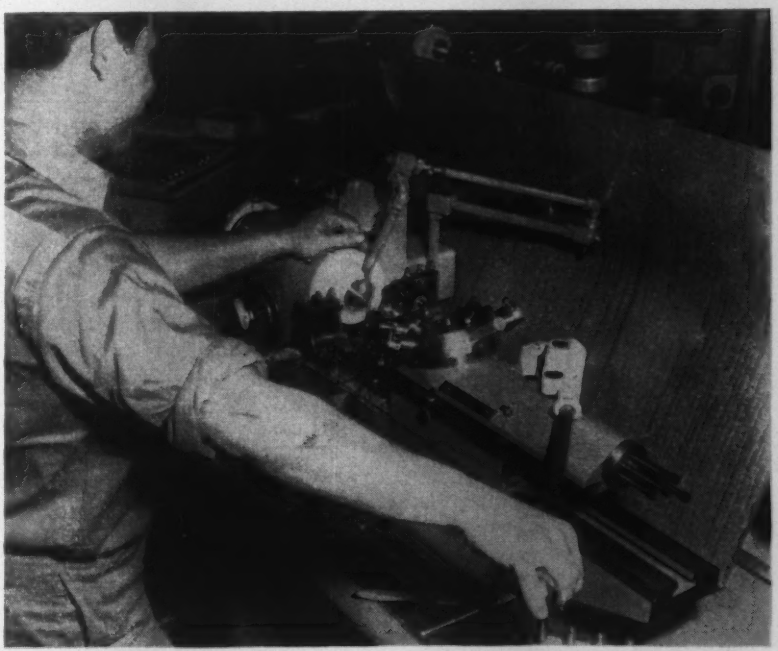
The clutches will operate under oily conditions, and may thus be placed within machine assemblies without any space-consuming protective housing. There's no concern for damage to the clutch by lubrication of adjacent machinery.

Wide Application—The electric clutches used in the hand turret lathe are among the smallest of a wide range of sizes and torque ratings.

Typical uses for the electric clutches of various sizes made by I-T-E include feed-drive and speed-changing controls, and brakes and couplings for a variety of machine tools, such as boring mills, planers, milling machines and grinders. Other applications include installation in more specialized equipment, such as conveyors, welders, test equipment, and steel rolling mills.



COMPACT UNIT: Small size of electric clutches and fact that they operate in oil allows easy, space-saving mounting within transmission cases.



PRECISION TURNING: Fast response of magnetic clutches to their controls insures accuracy of speed and torque in lathe at Gremar Mfg. Co.

New Alloy Fills Space-Age Need

High - temperature strength and good machinability are a hard combination to find.

A new alloy steel combines both these properties with good ductility. Its weldability is another advantage.

▪ Alloy steels are a mainstay of the missile industry. They're used for propellant chambers and other missile parts.

Dependability is a must. Therefore, the material from which the parts are formed has to give top reliability, and also must have a high strength-to-weight ratio.

A change in the AISI 4100 series steel—by adding cobalt as an alloying element—creates a new ultra-high-strength steel. Called Unimach UCX2, it fits many space-age needs.

High Yield Strength—The new alloy steel, made by Universal-Cyclops Steel Corp., Bridgeville, Pa., goes into rocket motor cases. These cases have yield strength levels of 225,000-235,000 psi.

When tempered, Unimach UCX2 doesn't tend toward notch sensitivity. This is important because it does away with the prime problems in making rocket cases.

Unimach UCX2 forms well. It also exhibits good weldability. This permits assembly of shaped parts. Results show that the cost of the rocket parts may tumble through use of the new alloy.

All standard mill forms are available. These include: forging billets, bars, wire, plate, sheet and strip.

Compare Tensile Properties

Sheet Thickness	Temper[a] Temp. °F	Hardness Rockwell C Scale	Ultimate[b] Tensile Strength psi	Yield[b] Strength 0.2 Pct Offset psi	Failure[b] Load psi
0.070 in. Notched	400	53	309,000	306,000	319,000
	550	53	305,000	302,000	316,000
	750	48	258,000	254,000	270,000
	1000	44	238,000	237,000	249,000
0.070 in. Unnotched	400	53	307,000	235,000	341,000
	550	53	284,000	248,000	337,000
	750	48	245,000	218,000	252,000
	1000	44	205,000	188,000	245,000
0.125 in. Notched	400	54	307,000	306,000	329,000
	550	53	301,000	299,000	310,000
	750	49	274,000	274,000	279,000
	1000	44	237,000	237,000	246,000
0.125 in. Unnotched	400	53	295,000	242,000	351,000
	550	53	288,000	246,000	371,000
	750	49	254,000	220,000	302,000
	1000	44	206,000	193,000	263,000

[a] Specimens prior to tempering were austenitized at 1700 °F for 30 minutes and oil quenched.

[b] Average value of two tests.

Easy to Machine—In the annealed condition, Unimach UCX2 machines easily. In the heat treated condition, its machinability equals that of AISI 4140. And it machines better than AISI 4340.

It can be deep drawn, rolled into rings, hydrospun and peened. All these operations take place as readily as with other AISI 4100 series steels.

Even though the new alloy contains 1 pct each of silicon and cobalt, it draws about 40 pct in one operation. Cold work and recrystallization have also been checked. Tests show no adverse effects.

Good Weldability—Most of the welding research to date has been automatic tungsten - arc - inert - gas welding. In this research work, the alloy exhibited good results. It needs little or no preheat and postheat. In the case of welding intricate parts, a stress-relieve anneal is required.

In experiments, it was found that filler wire conforming essentially to the chemical analysis of the base metal—but with lower carbon—gives best results.

Here are a few welding hints to follow. Dry the pieces to be joined at 250°F for 12-24 hours. Grit blast sheared edges, but avoid the use of sand. Then clean these edges with a degreasing cleanser.

For critical high-strength uses, Unimach UCX2 requires close control of composition. Universal-Cyclops melts the alloy under tight controls in an electric arc furnace. They use a Duomelt—consumable electrode vacuum melting—process to obtain a high degree of cleanliness.

The Duomelt process produces top homogeneity. Chemical composition of the alloy appears in the box.

General Heat Treatment—Unimach UCX2 develops high strength with good ductility when properly

heat treated. It must be heated slowly and uniformly to forging temperature. Reheating takes place as often as needed to complete the forging.

Initial forging begins at 1850-1950°F. Working operation shouldn't go below 1650°F. Cooling must take place slowly and uniformly.

Forged parts may be buried in dry ashes or mica. They require prompt annealing after cooling to 200°F. For best machinability, normalize from 1700°F and cool at 1250°F for several hours.

Annealing Operations—Annealing consists of heating uniformly in controlled atmosphere furnaces to 1440°F. Hold this temperature, within + or —20°F for 2 hours. Then fast cool to 1250°F.

Hold the heat at 1250° for 14-24 hours. Maintain heat within + or —15°F. Then allow air cooling to room temperature.

Tensile properties of Unimach UCX2, in sheet form, appear in the table. Notched and unnotched sheet samples were tested. The tensile data show no marked directional changes of test values in cross-rolled sheet.

Mechanical Properties — The chart shows mechanical properties at a glance. These test results are for sheet specimens hardened from 1700°F and double tempered at various temperatures.

Physical properties of Unimach UCX2 include: Specific gravity is 7.684; density is 0.276 lb per cu in.; coefficient of thermal expansion at 80-600°F equals 5,680,000 in. per in. per degree F; and Elastic Modulus is 29,400,000 psi.

It's realized that the normal tensile tests don't show the ability of the alloy to withstand multiaxial stresses. Many high pressure vessels produce such stresses.

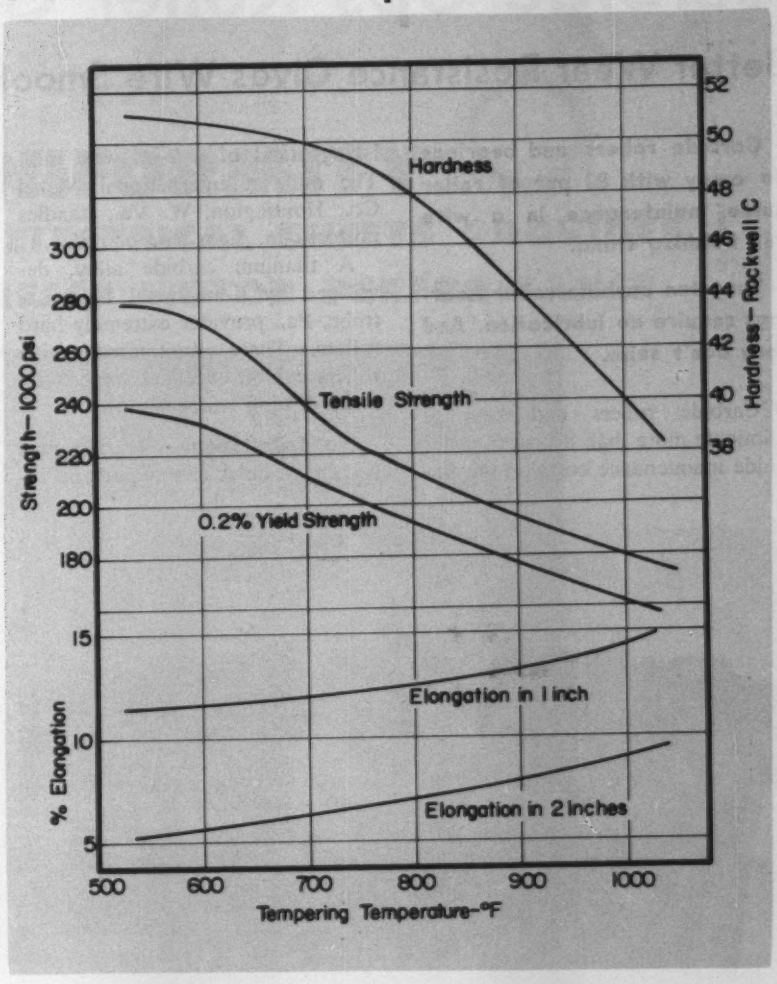
Hydrostatic tests check out the alloy under proper test conditions. The hoop stress, computed from the burst pressure, equals about 280,000 psi.

Not Notch Sensitive—Test results indicate that the alloy isn't notch sensitive when tempering takes place at 700°F. A slight tendency towards notch brittleness appears in the tempering range 700-800°F.

Bend tests on the alloy show that welds can be bent a full 180° without fracture. This is true of transverse as well as longitudinal samples. All bends were made over a ⅜-in. radius mandrel.

Mr. C. C. English, manager of high-temperature sales at Universal-Cyclops says, "As the advantages of Unimach UCX2 become more completely and widely recognized still greater expansion of the application of this steel seems certain." Its combination of high strength and easy fabrication may lead Unimach UCX2 to other uses in airborne vehicles.

Mechanical Properties Charted



Typical Analysis

	Pct.
Carbon	**0.39**
Manganese	**0.70**
Silicon	**1.00**
Chromium	**1.10**
Molybdenum	**0.25**
Vanadium	**0.15**
Cobalt	**1.00**

Carbide Ups Roller Guide Life

Better Wear Resistance Gives Wire Smoother Finish

Carbide rollers and bearings do away with 80 pct of roller guide maintenance in a wire mill finishing stand.

Tungsten carbide roller bearings require no lubrication. And they don't seize.

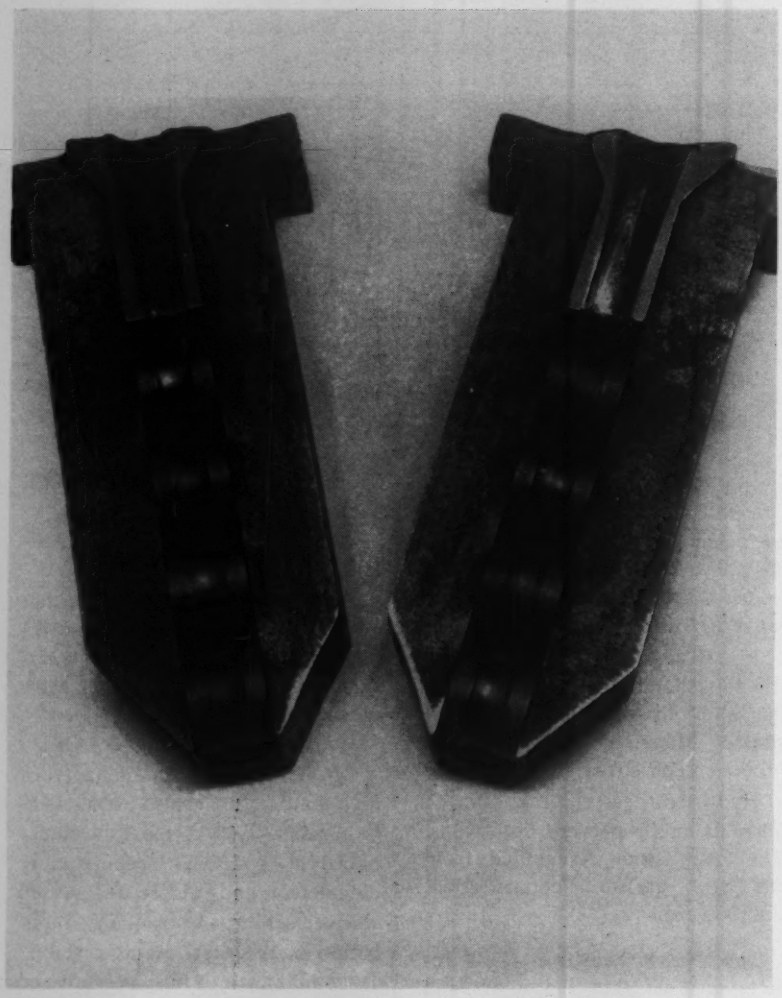
▪ Carbide rollers and bearings eliminate more than 80 pct of roller guide maintenance costs on the finishing stand of a 9-in. wire mill. The mill, at International Nickel Co., Huntington, W. Va., handles up to ¼-in. diam wire or rod.

A titanium carbide alloy, developed by Kennametal Inc., Latrobe, Pa., provides extremely hard rollers. These Kentanium guide rollers exhibit excellent wear resistance at high temperatures.

No Lubrication — Bearing pins for the guide rollers require no lubrication. They are made of Kennametal, a tungsten carbide alloy.

Life of the new guide rollers with unlubricated conical bearings is twenty times that of steel rollers with lubricated needle bearings. The roller sets average an 80-hr life.

Wire and rod quality improve because the longer wearing guide rollers cut down on scratching. Longer roller life also increases actual mill operating time.



GOOD WEAR QUALITIES: Titanium carbide rollers and tungsten carbide cones, in roller entrance guides on a wire mill finishing stand, reduce material and maintenance costs. Rod and wire quality is improved.

Cut Failures — Failure of steel roller guides is common. Bearings seize due to lack of lubricant or other factors induced by high temperatures. Steel roller guide unit life averages only 4 hr.

An average 40-hr schedule requires about ten sets of the steel guide units. Each set consists of eight rollers and bearings. Maintenance of the steel guide rollers takes 20 manhr for every 40 hr of production.

At the end of the first 460 hr with carbide rollers, only two failures occurred: A center nib broke due to an excessive overload; and a roll wore out as a direct result of the broken center.

Little Trouble — Maintenance costs exceed $4000 for one year's operation with steel guide rollers. It will cost about $800 per year with titanium carbide rollers. Current maintenance primarily consists of cleaning and adjusting the guide rollers.

During the first 460 hr of mill operation with the new guide rollers, more than 100 sets (over 800 steel rollers and bearings) of the old guide units would have been scrapped.

The mill operates 3600 hr per year. This means that the carbide units save over 850 sets of roller guides in single year's time.

Acme-Newport Steel

UNIFORMITY

IN ELECTRICAL SHEETS PROVIDES PERFECT MOTOR PERFORMANCE

FINE ELECTRICAL EQUIPMENT has its beginning in the electric furnaces of this basic steel producer. A mill recognized for over forty years for its absolute adherence to every specification for high-quality electrical grades.

Complete control through successive steelmaking processes ensures uniformity in physical characteristics and electrical and magnetic properties. Exceptionally true to gage, free from burrs and breaks in punching, easy and economical to assemble, Acme-Newport electrical sheets prove as satisfactory to manufacturers of rotating equipment as to ultimate users. Let our metallurgists give you details.

Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
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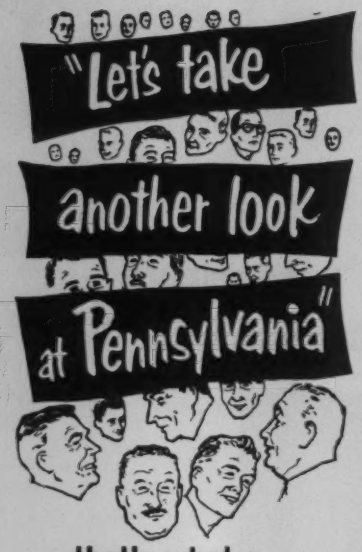

...that's what a growing number of industrial executives are saying and doing!

During the past three and a half years, they announced

307 NEW PLANTS
258 RE-OPENINGS OF IDLE PLANTS
666 PLANT EXPANSIONS

(Send for the list—address below)

They are finding:

Surplus of industry-minded workers . . . Strategic locations in the great Eastern market with access to major trunk line railroads, and modern highway and Turnpike networks . . . Ports on the Atlantic, St. Lawrence Seaway and Ohio River system . . . All types of industrial raw materials and components . . . 100% low-interest plant financing in labor surplus areas . . . Choice of industrial "parks" and individual plant sites.

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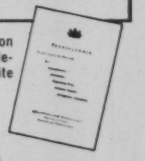
- No tax on machinery or inventories

For free copy of "Plant Location Services" pamphlet, or for details on 100% financing, write or call:



Pennsylvania Department of Commerce

South Office Building
673 State Street, Harrisburg, Pa.
Phone: CEdar 4-2912

You Arbitrate It!

DOUBLE TROUBLE

From the files of
The American Arbitration Association

■ The superintendent of a foundry happened to glance out of his office window one afternoon and noticed one of the coremakers driving off the parking lot. It was still 45 minutes to quitting time, so he assumed the man had asked for and received permission to leave early. But when the time cards for the week came to his desk, he saw that the coremaker's card had been punched a few minutes after quitting time. Obviously, someone had done him a favor at the company's expense.

On checking the other cards, it became clear that the coremaker's card could have been punched only by one of two men who punched the clock during the same minute. Each denied he was guilty. The coremaker admitted he didn't punch his own card, but refused to say who did. So the coremaker was fired and the two suspected men were each given a 3-day layoff.

One Man Innocent—The union didn't protest the discharge, but filed a grievance on behalf of the two employees. "You can't punish an innocent man," said the shop steward. "And you can't punish them for not squealing on each other. Union men aren't expected to do that."

"Employees have an obligation to the company, and that includes working with management to suppress dishonesty," answered the industrial relations director. "If the guilty man came forward, the other would not be punished. Under the circumstances, a 3-day layoff for both is very light punishment."

The dispute couldn't be settled in grievance procedure and eventually went before an arbitrator under the rules of the American Arbitration Assn. How would you rule?

"You Arbitrate It!" appears in the second issue of The IRON AGE each month. Look for it in the March 10 issue.

The Arbitrator Ruled:

He agreed that one of the two men deliberately punched out for the coremaker. And he added that if the company had been able to prove which one did it, even heavier punishment would have been justified. But he agreed with the union that it was up to the company to prove a case against the guilty man. The discipline had to be reversed.

CAUTION: The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.

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"Job Tempered"

Hack Saw Blades

UNIFORMITY PAYS OFF! Uniform set gives the teeth of every Heller blade the clearance needed for straight, fast cutting. Uniform shape, spacing and height of teeth distribute wear evenly and lengthen life. Uniform temper over the full length of every blade adds extra resistance against stresses and strains.

TEST THEM YOURSELF! You'll find that Heller's certified uniformity within each blade and from blade to blade adds up to superior cutting at lower costs. Your nearby Heller distributor has a complete line of Heller Hack Saw Blades . . . 3 types for power use . . . 3 types for hand use . . . in all standard specifications. So, he can help you select the right blade for any job.

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3 Ways to Increase Production

1 PROVIDE PARTS CLEANING SOLVENT CANS AT THE MACHINE

Keep machinists doing **productive** work—eliminate unnecessary trips to centrally located parts cleaning station. Machine Bench Can attaches to machine or bench. Depressing fire safe Dasher dips parts; releasing pressure returns parts for draining. 10" x 7" x 8" deep; Capacity 2 gallons.

2 CLEAN SMALL PARTS AT WORK STATION IN AIR OPERATED MACHINES

Clean small machined parts in flammable solvents safely and automatically with Protectoseal Air-Matic Parts Washers. Require no attention from operator during wash cycle. Parts in basket are moved **through** solution to provide effective cleaning action. Operate on 35 psi. Cap. 6 gal; 30 lb. basket load; 15" x 15" x 25½" deep.

3 APPLY FLAMMABLES WITH AUTO MATIC PLUNGER CANS

Use automatic, fire safe Protectoseal Applicating Cans for assembly or cleaning operations requiring use of flammable solvents. Depressing dasher pumps a measured quantity of solvent into dasher cup to dampen swab, brush, or sponge. Saves time, solvent, reduces toxic or explosive vapor hazard. Made in 7 sizes; capacities to 2 gallons of solution.

Write for Protectoseal Catalog of fire-safe products for handling, dispensing, and use of flammable liquids in production operations.

THE PROTECTOSEAL COMPANY

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 165.

Speed Reducers

Motorized speed reducers are listed, described, and illustrated in a 28-page bulletin. Additional information includes: lubrication of reducers, selection, service application factors, specifications, and other pertinent data. Included is a section on motorized speed reducer mountings and shaft projections. (American Stock Gear Div., Perfection Gear Co.)

For free copy circle No. 1 on postcard, p. 165

Spray Coating Machine

A short brochure describes a method of application of coating compounds to small articles, such as electrical and electronic components at a rate of 4000 per hour. It reports further how sprayable resinous compositions can be used to completely form a light tight seal for selenium diodes. (Conforming Matrix Corp.)

For free copy circle No. 2 on postcard, p. 165

Roof Coatings

Application details and complete specifications on a line of aluminum roof coatings are contained in an eight-page brochure. The line of roof coatings, reinforced with fiber glass, offers increased roof protection, adhesive qualities, and interior building cooling. The roof coatings can be used over new or old roofs of felt, composition, corrugated or metal. (The Garland Co.)

For free copy circle No. 3 on postcard, p. 165

Two-Way Valves

A line of two-way valves for air, oil, water, gas, or chemicals is described in an eight-page bulletin. Supplied in the bulletin are specifications, ordering information, outstanding features, and dimensions. (Airmatic Valve, Inc.)

For free copy circle No. 4 on postcard, p. 165

Hoist Versatility

Descriptions and illustrations, on a crawler crane-excavator series, are contained in a 24-page catalog. The machine's versatility on different type jobs is: use as a crane, magnet, clamshell, dragline, shovel, and backhoe. (American Hoist & Derrick Co.)

For free copy circle No. 5 on postcard, p. 165

Air Filters

The construction and application of permanent, washable unit air filters is contained in a bulletin. Types of filters illustrated and explained are: a high capacity, low resistance unit, heavy-duty metal filter, an aluminum filter unit, spray booth filter, and special air filters. Some of the additional information included is filter maintenance methods, charts, arrestance-resistance curves, and engineering data. (American Air Filter Co., Inc.)

For free copy circle No. 6 on postcard, p. 165

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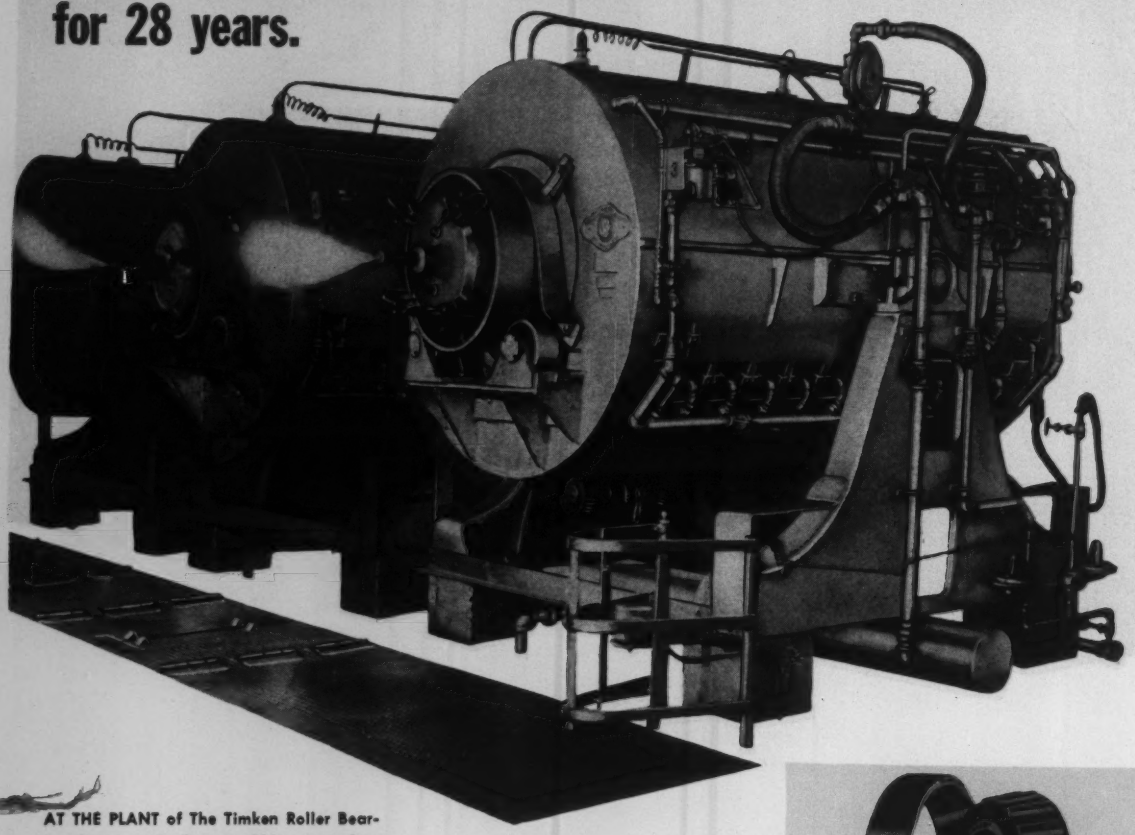
AGF ROTARY RETORT CARBURIZERS have been used for heat treating TIMKEN ROLLER BEARINGS for 28 years.



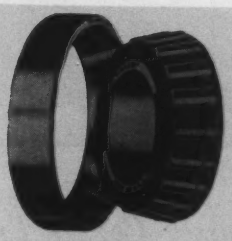
AT THE PLANT of The Timken Roller Bearing Company in Canton, Ohio, more than 22 of these AGF Model No. 4 Rotary Retort Carburizers have been purchased over a period of years for carburizing rollers and races of roller bearings.

Each furnace is capable of receiving loads of 1000 to 1300 pounds depending upon the size and shape of the work. A cold charge is raised to carburizing temperature within 1½ to 2 hours from the time it is introduced and, of course, the carburizing cycle is maintained at temperatures up to 1700°, depending upon the case depth required.

Deep quenching tanks are located in front of the machines for end of cycle quenching.

MANY ADVANTAGES. Since 1925, TIMKEN has used AGF Rotary Carburizers. The ones shown were photographed after 9 or 10 years of operation. They are easy to maintain, convenient to use and have innumerable exclusive features.

Most important in carburizing rollers for roller bearings, the constant rotation of the work in the rotating retort leaves no possibility of variations in case. "Point of contact" carburizing case variations are entirely eliminated by this positive method. Three separate control zones assure uniform temperatures throughout the work space.



TIMKEN

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TAPERED ROLLER BEARINGS

TIMKEN Roller Bearing quality is known throughout the world and American Gas Furnace Co. is proud to have furnished some of the production equipment that helped establish and maintain that quality. AGF has furnished TIMKEN more than 100 heat treating and carburizing furnaces.

For 76 years AGF has PIONEERED in the invention, development and manufacture of industrial gas equipment for heat treating and other processes. Submit your problems to AGF metallurgists and engineers. WRITE for New Catalog. NOW.

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FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Alignment Guide

Fully explained in a brochure, is a pipe alignment guide. The guides help insure the proper operation of the expansion joint or loops by allowing only axial movement of the pipe, preventing lateral movement or deflection. (The Align-o Pipe Guide Co.)

For free copy circle No. 21 on postcard

Metal Shapes

Over 500 roller die, cold formed metal shapes and tubing for which rolls and dies are on hand, are illustrated in a 48-page booklet. Tooling costs are eliminated to the purchaser of any of the shapes presented. (Van Huffel Tube Corp.)

For free copy circle No. 22 on postcard

Process Equipment

Operating principles, photographs of typical installations, and a description of equipment for the process industries is featured in a 12-page bulletin. Pumps, pneumatic conveyors, fluidizing conveyors, horizontal-grate coolers, and induced draft fans is some of the equipment listed. Tables of dimensions and capacities and schematic illustrations supplement the information. (Fuller Co.)

For free copy circle No. 23 on postcard

Anodizing Aluminum

A booklet offers questions and answers about anodizing. The cost of anodizing aluminum, and the amount of heat anodic films can withstand are some of the questions answered in the booklet. (For free copy write on company letterhead to Reynolds Metals Co., Dept. PRD-26, Richmond 18, Va.)

For free copy circle No. 24 on postcard

Small Hole Driller

Complete information on a precision ultra-fine hole driller can be found on a data sheet. Featuring an Albrecht micrometer chuck, or a Jacob's chuck, the driller has an accuracy of 0.0002 in. The hole driller also has finger tip control. (Hunter Tool)

For free copy circle No. 25 on postcard

Control Systems

Hydraulic tracer control systems for one, two, and three dimensional applications on machine tools are described and illustrated in a four-page bulletin. Also presented are: an automatic programmed 3-D duplicating system, a 45° lathe tracer attachment, and a pivot-type lathe tracer attachment. Data on tracer components is also included. (True-Trace Corp.)

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Roller Bearings

Complete engineering information is available on spherical roller bearings in a 16-page bulletin. Meeting the requirements of heavy-duty applications, the bearing is automatically self-aligning and accommodates heavy radial and shock loads. High contact angle provides substantial thrust in either direction. (Bearing Div., Hoover Ball & Bearing Co.)

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Resistance Welding

A variety of resistance welding case histories is fully described in a 16-page bulletin. (Sciaky Bros., Inc.)

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Drip-Proof Motors

A bulletin, on drip-proof motors, illustrates five outstanding design features. A detailed explanation follows on how these motors can replace totally-enclosed motors in

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applications where adverse atmospheric conditions are prevalent. (Sterling Electric Motors, Inc.)

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Grinding Machines

Two precision, thread and form grinding machines are reported in a 12-page catalog. Both machines are designed for production and toolroom thread and form grinding. The machines can plunge-grind class 3 threads 8 to 40 pitch and precision worms. (The Sheffield Corp.)

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Fire-Fighting Guide

Colorfully illustrated, a 28-page catalog provides the latest up-to-date engineering facts and specifications on fire fighting equipment. Interior fire control systems are featured. (The Fyr-Fyter Co.)

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Towline Systems

A booklet reviews towline systems employing automatic switching, and accumulation and safety bumpers, also outlining possible accomplishments in these systems. (SI Handling Systems, Inc.)

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Condensation Pumps

A 12-page bulletin explains and illustrates six basic condensation pumps, including design features, engineering data, general specifications, dimension drawings, and construction and operation details. (American Air Filter Co., Inc.)

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Color Coded Material

A tough, plastic material, completely impervious to oils and greases, is described in a two-page brochure. The material, used for gaskets, washers, shims, or spacers, is color-coded in a range of 12-gages, each in a distinctive color. Also available is a color code guide to provide quick identification of each gage available. The brochure also touches on the fabrication of sealing devices in any size, shape, or material. (General Gasket, Inc.)

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Welding Electrodes

Complete information on all types of electrodes is presented in a 64-page booklet. A brief description, applications, procedures, and pertinent A.W.S.-A.S.T.M. data is listed for each electrode. Charts of recommended electrodes for welding A.S.T.M. and trade name steels, and comparison tables for mild steel and hardfacing electrodes of leading manufacturers are included in two eight-page foldouts. (Air Reduction Sales Co., Div. of Air Reduction Co., Inc.)

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Band Machines

A line of high-tool-velocity band machines are described and illustrated in an eight-page catalog. This high velocity machine quickly cuts ferrous materials, nonferrous metals, and nonmetallic materials. Applications, design details, specifications and attachment list fill the catalog. (The DoAll Co.)

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Bonnet Valves

Descriptions and illustrations of pressure-seal bonnet valves are contained in a short folder. The line covers any replacements or extensions in high-pressure steam piping. Also, lip-seal bonnet globes and checks are briefly covered. (Crane Co.)

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Wound Wire Metal

A six-page, two-color brochure, on wound wire porous metal for filtration and non-filtration applications, is available. The pamphlet contains detailed capabilities and typical examples of wound wire porous metal with photographs, drawings and curves. (Bendix Filter Div., Bendix Aviation Corp.)

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Who Buys Roebling Upholstery Spring Wire After You Do?

The end-user can hardly be expected to know a great deal about Roebling helical spring wire, border and brace wire, zigzag and no-sag wire, wire for automatic machines, lacing wire . . .

Thus, the qualities of uniformity, temper, tensile strength, size and finish that are yours whenever you use Roebling Spring Wire mean long life, resiliency under constant use (and abuse) where it counts the most . . . to those who buy Roebling Upholstery Spring Wire after you do.

For further information on the wide range of types, the consistent superiority and availability of these and other Roebling wire products, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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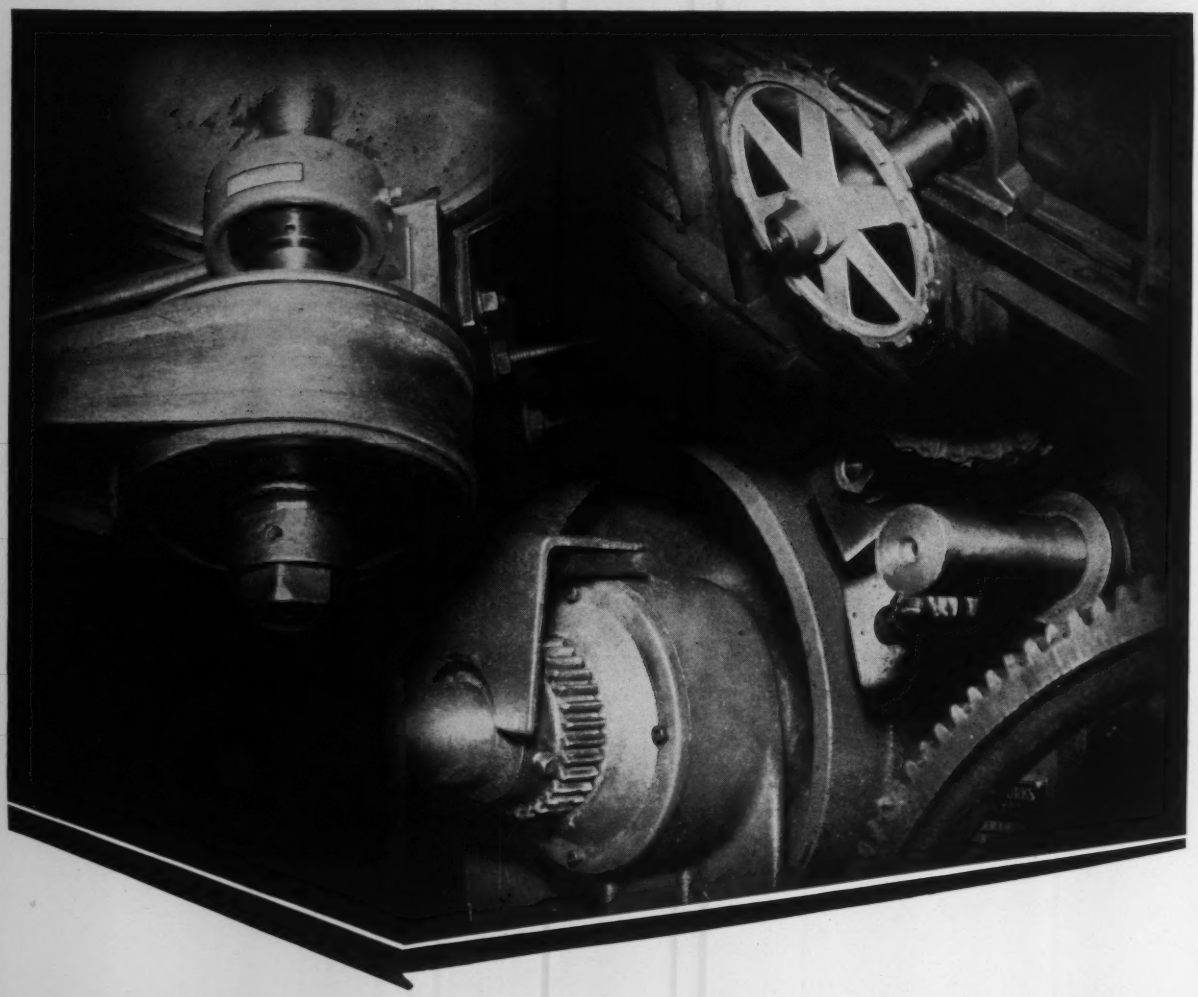

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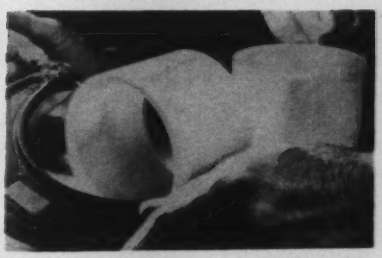
New Materials and Components

Vacuum Tube Applications Use Beryllium Oxide

Processed for vacuum tube applications, a beryllium oxide ceramic material is vacuum tight, free of outgassing, and has a surface suitable to metallizing. Valuable for electrical insulating, internal support, and heat sink components, the material has high hardness, good thermal shock resistance, a low coefficient of expansion, and retention of electrical insulating value at high frequencies and temperature. (National Beryllia Corp.)

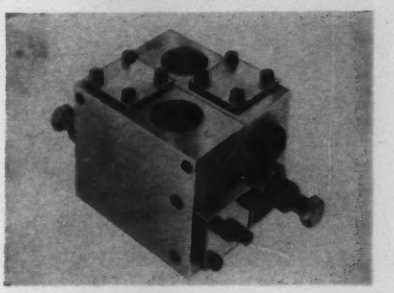
For more data circle No. 39 on postcard, p. 165



Valves Control Pressure in Hydraulic Circuits

When motion is not desired, a new valve locks a cylinder or motor. The valve prevents the load from running ahead of oil supply when load is being moved, relieves excessive pressures generated in cylinder or motor by the load, and allows the load to be lowered manually in the event of a power failure. Single models with an external pilot and port, and double models with internal pilots are designed for up to 3000 psi service at flow of 20 gpm or higher. (Sarasota Precision Products, Inc.)

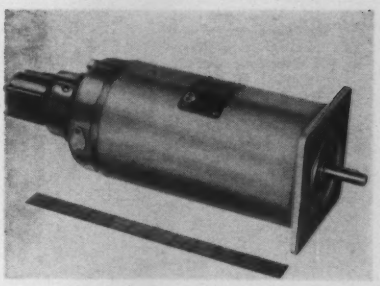
For more data circle No. 40 on postcard, p. 165



DC Motor Features Fast Acceleration

Servo motors provide rapid starts, stops, and reversals. The high response of the motors is due to the very low armature inertia and high accelerating torque. The low weight of 47 lb, short length of 11-23/32 in., and flange mounting design allow direct mounting on the machine in any position. Typical applications are: numerical positioning for tracer drives, feed drives and machine tool positioning, and automatic welding positioners. The motors respond rapidly to control signals. (Reliance Electric & Engineering Co.)

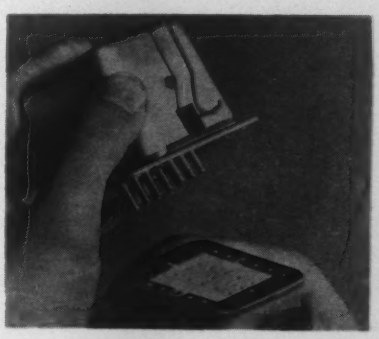
For more data circle No. 41 on postcard, p. 165



Control Device Regulates Physical Quantities

A variable resistance device, responsive to 0.0001 in. of mechanical movement, directly controls up to ¼ kw of power. The use of the transducer, in the production of metal and metal products, eliminates the need for complex installation and expensive amplifiers. Any quantity, appearing as a change in position, can move the unit's actuator to initiate control. Shaping the linkage rod accomplishes mechanical connection of the unit, and the plug-in feature simplifies external wiring. Life expectancy of the transducer is moderately placed at 50,000 hours. The device needs no cleaning, adjustment, or lubrication. (Electric Regulator Corp.)

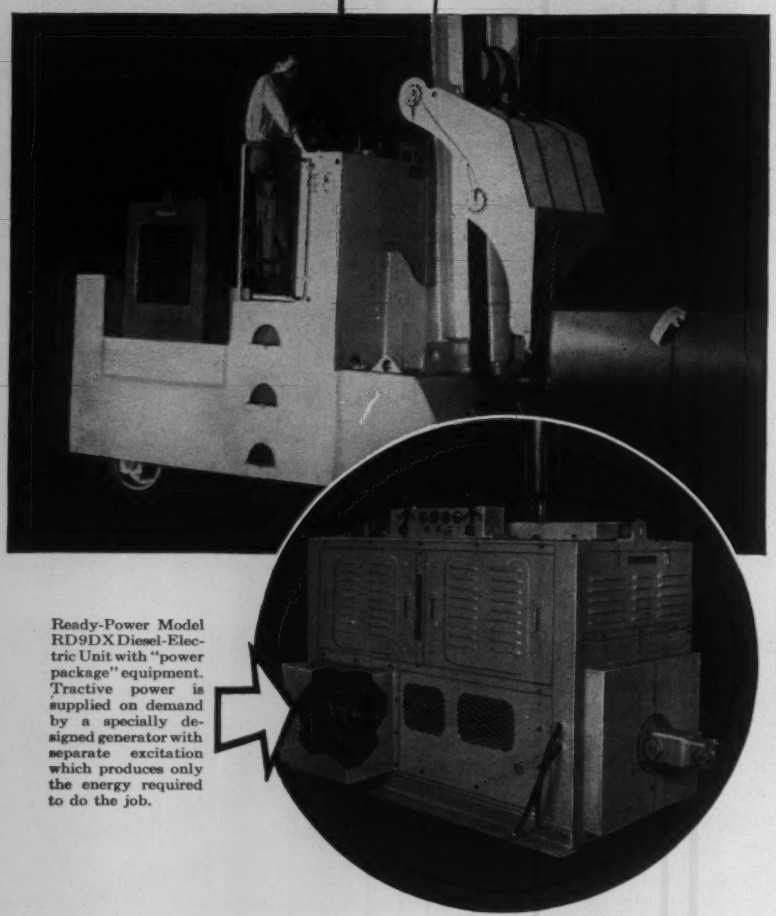
For more data circle No. 42 on postcard, p. 165



New Diesel-Electric "Power Package" Does Both Jobs Economically

1 GENERATES TRUCK MOTIVE POWER

2 DIRECT-DRIVES HYDRAULIC PUMP



Ready-Power Model RD9DX Diesel-Electric Unit with "power package" equipment. Tractive power is supplied on demand by a specially designed generator with separate excitation which produces only the energy required to do the job.

Ready-Power makes diesel-electric power doubly effective with a newly developed "power package" designed specifically for use with its "RD" Series Power Units. This remarkable new concept allows the unit to operate at *constant speed*, no load to full load, yet supplies full range of tractive power on demand and produces continuous hydraulic power without need for intermediate electric motors. The last word in simplicity, this new "power package" eliminates contactor failure, minimizes maintenance, assures maximum operating economy for electric trucks up to 200,000 lb. capacities. Write for complete information.

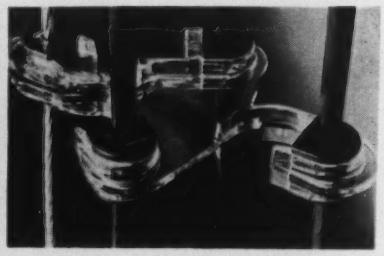
READY-POWER

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

DESIGN DIGEST

Spacer Systems

An economical and practical way to avoid clutter of overhead lines is the use of spacer type aerial cable systems. A one-piece Plexiglas unit with neoprene grommets comprise the spacer. The grommets, slotted to slip around the cable, snap easily



into the spacer's guide paths and are held securely in position. The cables, held 6-in. apart, are specially designed to combine high strength with low resistance. (Kaiser Aluminum & Chemical Sales, Inc.)

For more data circle No. 43 on postcard, p. 165

Unique Thermostat

Setting the adjustment control to the lowest position allows a new double pole thermostat to break both poles of the input lines. In the temperature control position, opera-

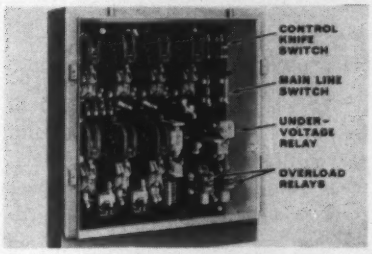
tion is normal. Thus the thermostat is both a thermostat and a manual on-off switch. (Norwalk Thermostat Co.)

For more data circle No. 44 on postcard, p. 165

Crane Control

Featuring self-contained undervoltage and overload protection, a crane control provides full magnetic control on any dc application up to 55 hp, 230 v. The control is suitable for mill accessory drives, as well as light industrial

cranes. The compact controller is front connected for mounting against walls or girders, in cabs,

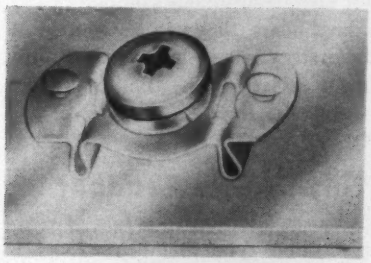


or in limited space. Hook speed without danger of overspeeding is another of its many features. (Square D Co., EC&M Div.)

For more data circle No. 45 on postcard, p. 165

Small ¼-Turn Fasteners

A sturdy ¼-turn fastener provides smaller dimensions to save weight and space. The receptacle measures 0.812 x 0.375 in. overall and 0.012 in. thick. Six different stud lengths accommodate total material thickness of 0.040 in. mini-

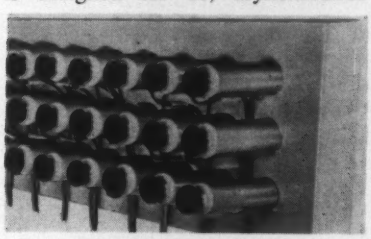


mum to 0.159 in. maximum. The fasteners feature easy installation, a 0.020 in. grip range in each stud length, and a ¼-turn to open and ¼-turn to close. (Southco Div., South Chester Corp.)

For more data circle No. 46 on postcard, p. 165

Fast Relay Switches

With operating time less than 750 microseconds, a new line of relays is designed for dc, asynchronous



and synchronous switching of low microvolt level to moderate level signal circuits. The driving system

Here he is folks . . . *Chief Keokuk*, favorite son of steel men and foundry-men everywhere, and he wants *your* vote! His platform: Kemco Silvery . . . *the superior form of silicon introduction*. He promises: Uniformity and Economy. When you think of silicon, *think* . . . and vote for Kemco!*

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SILICON METAL—OTHER FERROALLOYS

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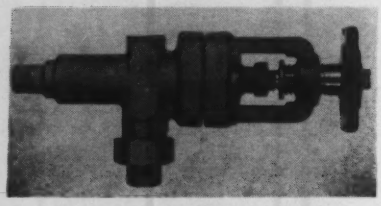
requires less than 500 milliwatts to the polarized center tapped coil. Thermal noise is less than 3 microvolts. Center position is off. (James Electronics Inc.)

For more data circle No. 47 on postcard, p. 165

Multi-Purpose Valve

An angle valve provides service for both liquid level gaging and instrument piping. It combines features which prevent freezing and eliminate problems of wear from galling. The valve serves as a basic



liquid level gage. With the addition of a special pipe plug, it becomes an instrument valve. This eliminates multiple connections for instrument and general use. (Jerguson Gage & Valve Co.)

For more data circle No. 48 on postcard, p. 165

Power Supplies

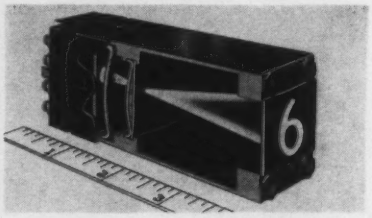
High-performance, regulated dc power supplies have tracking dual outputs of ±300 v at 500, 300, and 100 milliamperes respectively. Features include, low dissipation, power transformers having a 30°C rise at 25 pct overload, circuit breakers with thermal sensing elements in the secondary which opens the pri-

mary, protection against line voltage surges, and an output ripple of about 200 microvolts ac. Designed for energizing analog computors and components, they can be applied in laboratory and industrial equipment. (George A. Philbrick Researcheds, Inc.)

For more data circle No. 49 on postcard, p. 165

Tiny Digital Readout

Latest addition to a line of rear-projection type digital readouts is a miniaturized model. The light source comes from tiny lamps. Voltage is 6 to 24 volts. On the



viewing screen, character size is 5/8 in. The unit's dimensions are 3 7/8 x 1 5/16 x 1 in. (Industrial Electronic Engineers Inc.)

For more data circle No. 50 on postcard, p. 165

Protective Coating

A protective coating for metals eliminates the need for baking. An epoxy acrylic, it comes in a wide range of colors, in any degree of

MicroRold®
STAINLESS STEEL
SHEET & STRIP

FIFTEEN YEARS AGO, we were the first stainless steel sheet producer to recognize the superiority of the Sendzimir Cold Reduction Process over conventional rolling equipment for exceptionally close tolerances.

Our equipment is such that tolerances can be held to as low as 3% (plus or minus), as compared to the A.I.S.I. maximum allowable variation of 10%. This "Thinness Control" means the ability to control decimal thickness with micro-accuracy, giving you more stainless area per ton or the equivalent area with less weight. It is this controlled accuracy and uniformity that directly relates to fabricating economies and satisfaction in the ultimate end use.

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gloss. Drying in only a few minutes, it can save space, time, and money in assembly-type operations. Some of its features are: good flexibility and adhesion, no discoloration when exposed to the sun, and resistance to elements injurious to metals. (Technical Service Department, Industrial Finishes Co.)

For more data circle No. 51 on postcard, p. 165

Nylon Lowers Friction

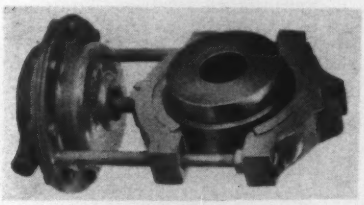
Designed to cut friction between two surfaces, as in cabinet drawers, a new tape is self-adhering. The user removes a paper backing and places the tape in the desired loca-

tion. Available in 100-ft coils, the tape comes in widths ranging from ¼ to 1 in. (Hardware Designers, Inc.)

For more data circle No. 52 on postcard, p. 165

Diaphragm Brake

A low torque diaphragm brake gives accurate tension control for applications requiring 1600 in.-lb of torque or less. It is quite suitable for unwinding stands of small cutters, as well as sheeters, slitters, or converting and printing machines



running foil. Self-adjusting for wear, and having a very low inertia, the brake can withstand high speeds. Its air diaphragm has a ¾-in. stroke; operation is manual or automatic. (Horton Mfg. Co., Inc.)

For more data circle No. 53 on postcard, p. 165

Pierced Metal Sheets

Perforated metal sheets screen, recover and dewater coal, aggregate and similar solids-bearing liquids passing through gravity or centrifugal separators. Sheet thickness can be up to seven times hole diameter. The working side of the pierced

metal sheet has humps, formed by the smaller ends of the tapered holes, that act in a shovel-like manner to guide material into the openings. (Cross Perforated Metals, National-Standard Co.)

For more data circle No. 54 on postcard, p. 165

Photoelectric Device

A photoelectric control incorporates the light source, photocell, and transistorized amplifier into a single package, 3⅜ x 2-9/16 x 5⅛ in. A single lens serves for the exit and return of the light beam. A special mirror returns the light beam directly back to the light source despite misalignment in excess of 15°. The light beam travels out and back

Stamco slitting and coiling lines

step up your production. We design practical installations, fitted to your needs. A Stamco installation is a profitable investment. Contact us today. No obligation.

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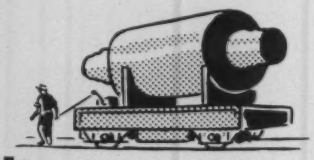
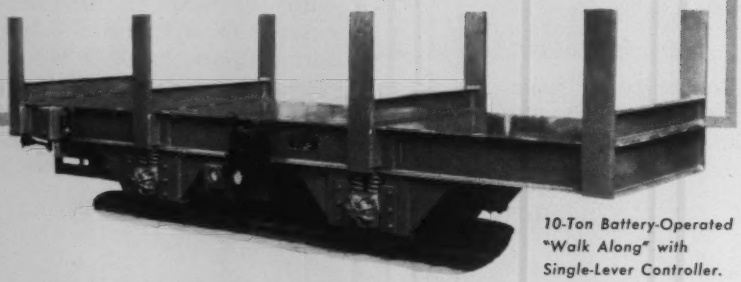
New Bremen, Ohio, U. S. A.

Slitting and Coiling Lines • Cut-To-Length Lines • Flying Shear Lines • Power Squaring Shears • Automatic Resquaring • Corrugating, Culvert and Steel Mill Equipment

Intra-plant Cross-bay Production line





10-Ton Battery-Operated "Walk Along" with Single-Lever Controller.

ATLAS "walk-alongs" handle your big loads with BIG savings

Altas Safety-Type Transfers are custom designed in any capacity, with single or double-end platforms or for popular "walk-along" service. Safe because there is only one control lever and the car moves only when the operator holds lever.

Battery Operated Roll Transfer Car

SPECIAL FEATURES . . . Deck and cradle arrangements designed for load-handling convenience. Optional power includes Storage Battery • Gas-Electric • Diesel-Electric • Cable Reel AC • Cable Reel DC • Cable Reel AC with fluid coupling • also remote control with no trailing cable.

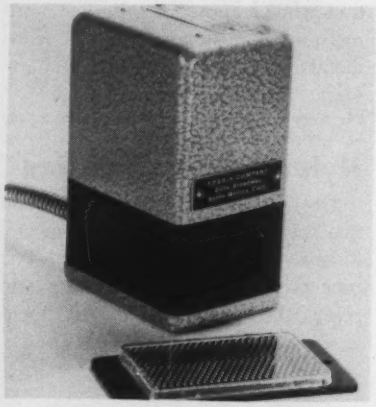
Request Bulletin 1283

ATLAS CAR & MFG. COMPANY

1140 IVANHOE ROAD

CLEVELAND 10, OHIO

through the same lens to the photocell via a half-silvered mirror. Insensitivity to surrounding light,



shock, and vibration, and ease of installation are some of its important advantages. (Presin Co.)

For more data circle No. 55 on postcard, p. 165

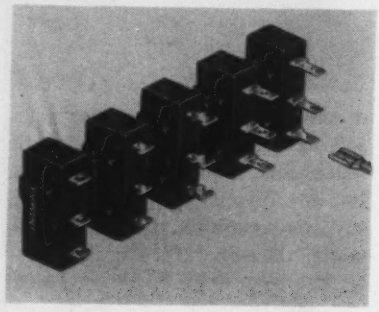
Inorganic Material

Comprised of bronze, molysulphide, and teflon, a bearing material combines self-lubricating qualities with a low coefficient of friction. The material has operational temperature capabilities from —300° to +500°F. The bearing material is available in 6-in. long bar stock in dimensions of 0.300-, ½-, ¾-, and 1.0-in. OD. (Booker-Cooper, Inc.)

For more data circle No. 56 on postcard, p. 165

Snap-Acting Switches

Subminiature precision snap-acting switches satisfy a number of assembly requirements. They are provided with three kinds of solder-



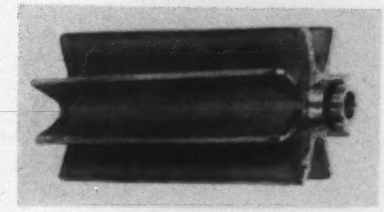
lug terminals; snap-on terminals, and terminals for printed-circuit wiring. The printed-circuit terminals fit 3/32-in. slots in wiring

boards. (Unimax Switch Div., The W. L. Maxson Corp.)

For more data circle No. 57 on postcard, p. 165

Small Size Filters

High flow, large cake capacity and small size are features of a new porous, stainless steel filter element. It has a 4-in. diam with lengths



from 6 to 18 in. Filtrations down to 2 microns are available. Operating temperatures range to 300°F. (Micro Metallic Div., PALL Corp.)

For more data circle No. 58 on postcard, p. 165

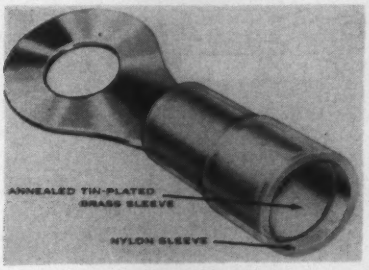
Spring-Steel Nuts

Composed of heat treated spring steel, a new line of nuts is available cadmium plated, nickel plated, black phosphate and plain. A low-cost, quality product, their dimensions are—⅛ in.-27 NPS, hex width 9/16 in. washer diameter ⅞ in. (Crest Products, Inc.)

For more data circle No. 59 on postcard, p. 165

Strong Terminals

A new line of solderless electrical terminals is described as the ultimate in high-performance design. They are reinforced by a seamless,



annealed, tin-plated brass sleeve. The sleeve is permanently attached over the regular terminal barrel. (ETC Inc.)

For more data circle No. 60 on postcard, p. 165

Control Quenching to Improve Heat Treating

● The NIAGARA Aero HEAT EXCHANGER transfers the heat from the quench bath to atmospheric air. It never fails to remove the heat at the rate of input, giving you real control of the quench bath temperature. You prevent flashing of oil quenches. You improve physical properties, save loss of your product from rejections, get faster production, increase your heat treating capacity.

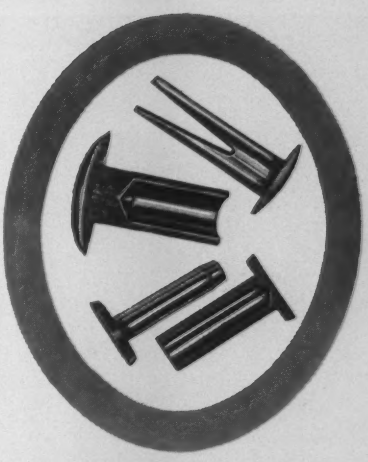
You have a closed system, freedom from dirt and scale. You avoid water supply and disposal problems.

Write for Bulletin 120 and 132

NIAGARA BLOWER COMPANY

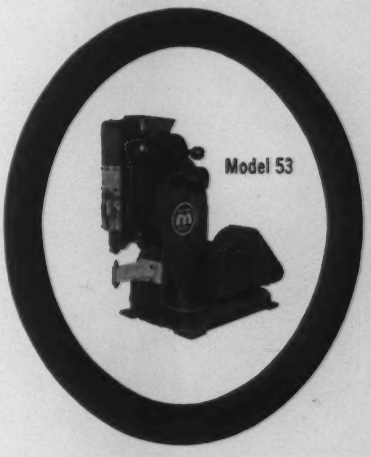
Dept. IA-2, 405 Lexington Ave., New York 17, N. Y.

District Engineers in Principal Cities



COST-CUTTING PRODUCTION TEAM!

. . . the two-way answer to assembly problems!



Here's a combination that cuts production costs and gets rid of assembly problems in a hurry—Milford Tubular Rivets made to high quality standards to assure a better finished product for you . . . Milford automatic rivet-setting machines that can be quickly adapted to your particular fastening needs. Write for more information on how you can put this team to work.

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
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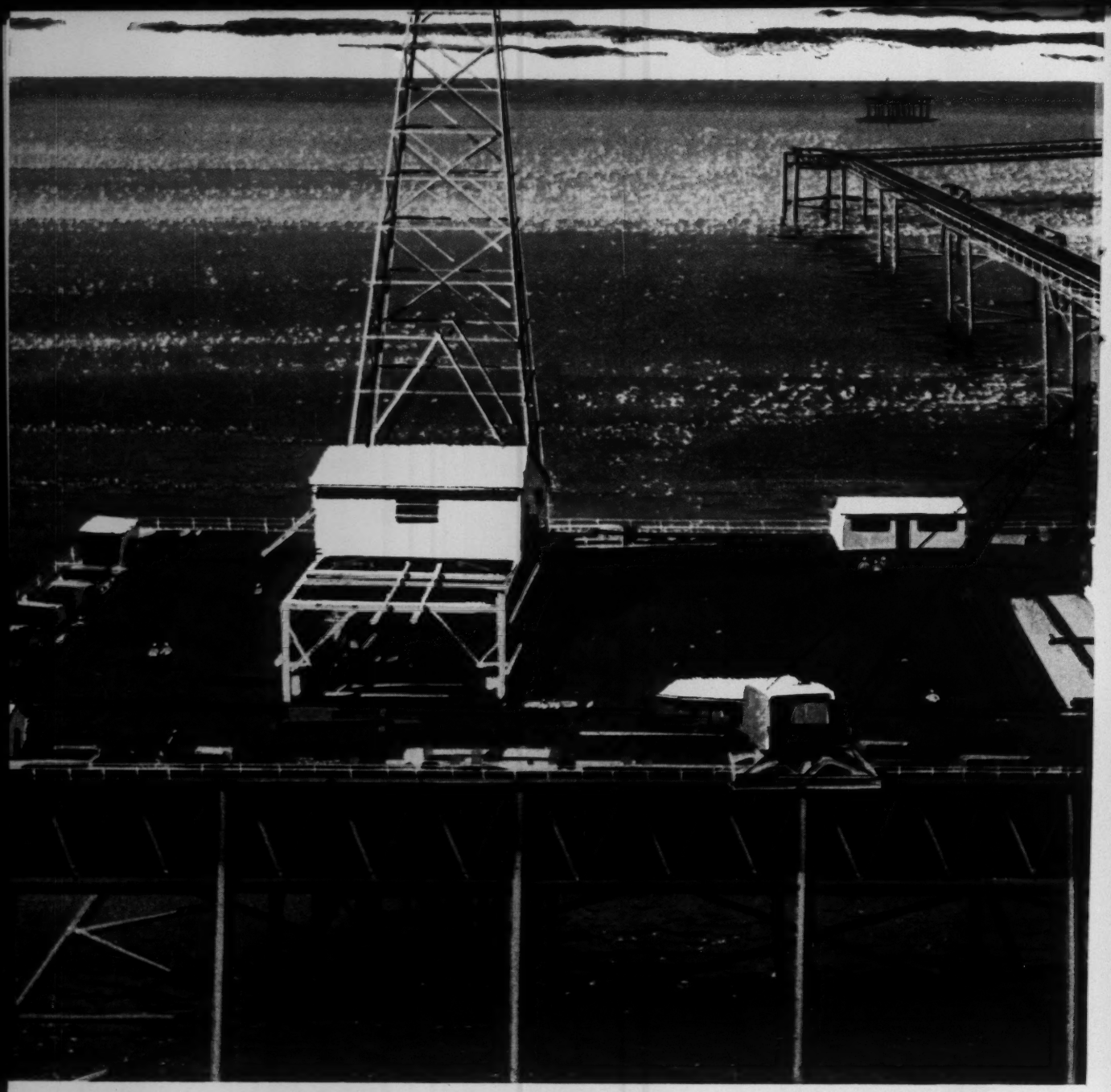

Biggest man-built island

SEVEN miles off the coast of Louisiana, reaching 220 feet below and rising 60 feet above the Gulf of Mexico, is a massive steel island. It's the world's first offshore sulphur mining plant.

This mine is a project of the Freeport Sulphur Company, and is scheduled to open in 1960. Known as the *Grand Isle*, it will be one of the world's largest sulphur mining operations. The Frasch process will be used. Every day, 5 million gallons of sea water, heated to 325°F., will be injected into the underground sulphur deposit. Hot water melts it. Compressed air will force the liquid sulphur to the surface.

The Gulf of Mexico brews black storms. Vicious storms. But this mile-long structure is built to take the brutal pun-

ishment of the sea. From end-to-end, it's braced with tons of heavy-wall pipe from National Tube.

National Tube is also supplying casing, line pipe and standard pipe for the completion of this project. For more than 80 years, National Tube has handled tough tubular installations in the fields of line pipe, marine piping, mechanical tubing and oil country tubular products. Write us for assistance. National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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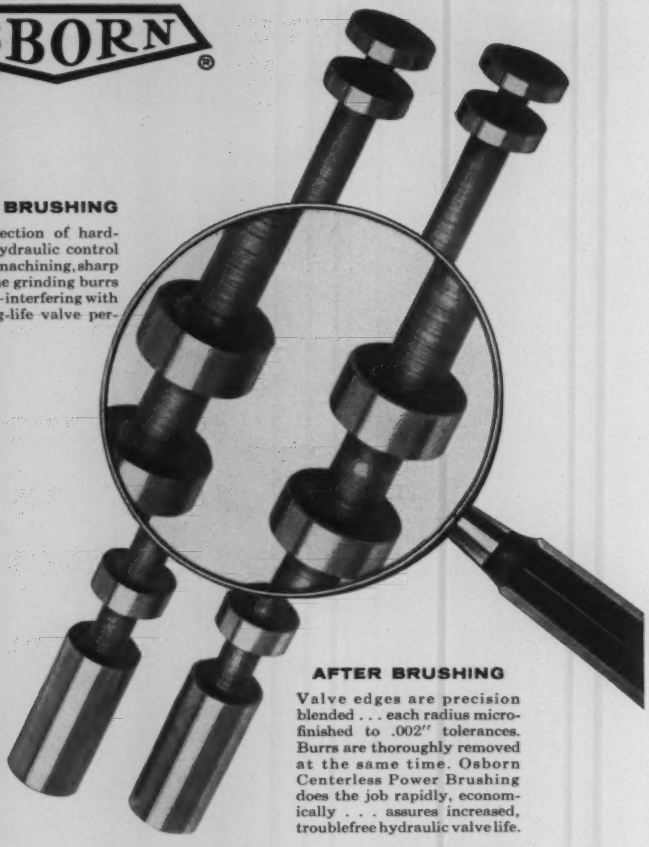


BEFORE BRUSHING

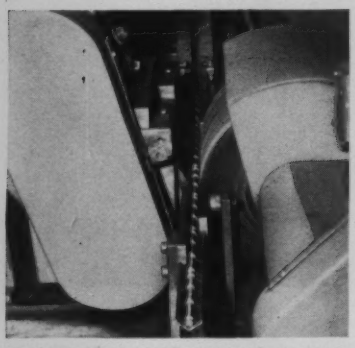
Magnified section of hardened steel hydraulic control valve. After machining, sharp edges and fine grinding burrs still remain—interfering with efficient long-life valve performance.

AFTER BRUSHING

Valve edges are precision blended . . . each radius microfinished to .002" tolerances. Burrs are thoroughly removed at the same time. Osborn Centerless Power Brushing does the job rapidly, economically . . . assures increased, troublefree hydraulic valve life.

Microfinishing valve edges to a .002" radius

. . . at rates of 1200 parts-per-hour with OSBORN Power Brushing



CENTERLESS BRUSHING SETUP precision finishes hydraulic control valves at production rates of 1200 parts-per-hour. Finish blend on valve edges can be controlled to any desired microinch tolerance. Job is done on a centerless machine—with Osborn Matic® Centerless Brushes operating at 1750 rpm.

HYDRAULIC component manufacturers today—producing parts like this control valve—require ultra-high degrees of precision finishing. And Osborn Power Brushing helps meet the demands of modern high-pressure hydraulics with quality finishing, deburring and surface blending methods for hundreds of different types of parts.

In addition to the versatility and *precise quality control* afforded by Osborn Power Brushing methods—leading manufacturers also find that finishing operations are done more rapidly . . . at significantly lower cost.

An **O**sborn **B**rushing **A**nalysis—made in your plant at no cost or obligation—can pinpoint where you can speed production . . . improve quality . . . cut costs with modern Osborn Power Brushing. Write us for full details. *The Osborn Manufacturing Company, Dept. F-91, Cleveland 14, O.*

Osborn Brushes

METAL FINISHING MACHINES . . . AND FINISHING METHODS
POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

NEW BOOKS

"Accident Prevention Manual for Industrial Operations" contains 1542 pages of data on every aspect of industrial safety. $15.50. The National Safety Council, 425 N. Michigan Ave., Chicago 11.

"Hidden America" by R. W. Robbins and E. Jones. A self-taught professional archaeologist tells of his successful discoveries of many buried landmarks of our heritage. "Hidden America" is informative, but could have been more readably written. The illustrations are fascinating. Anyone interested in American history or archaeology might enjoy the book and readers of The IRON AGE will find the chapter on the Saugus Ironworks of particular interest. $5.00. Alfred A. Knopf, 501 Madison Ave., New York 22.

"Proceedings of the 23rd Annual Industrial Engineering and Management Clinic" consists of 171 pp. with charts, forms and illustrations. Transcripts of talks by leaders of labor, management and government on various topics include: work measurement, methods, work simplification, operations research, materials handling and plant layout, systems simulation, product development, wage incentives and human relations. $6.00. The Industrial Management Society, 330 S. Wells St., Chicago 6.

"Thermodynamics," Second Edition, (1959), by F. P. Durham, is a simplified presentation of thermodynamics. The basic material in the text was developed and used in classes at the University of Colorado, prior to publication. 349 pp. $6.25. Prentice-Hall, Inc.

"Basic Engineering Metallurgy," Second Edition, by C. A. Keyser, provides a fundamental approach to many important phases of engineering metallurgy. The chapter on mechanical properties of materials and metal failure is especially well

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NEW BOOKS

written. The author frequently uses diagrams as building blocks in expanding his text. This technique is especially well suited to explaining phenomenon such as slip lines. 507 pp. $8.50. Prentice-Hall, Inc.

"Moleculonics," by E. L. Holbrook, is a 54-page, pocket size, book that features some unusual applications of fluid power circuits. Diagrams illustrate how to solve special control and automation problems. $1.00. Modernair Corp., 400 Preda St., San Leandro, Calif.

"Welding Handbook, Section Two, Gas, Arc and Resistance Welding Processes," edited by A. L. Phillips, covers these processes and the equipment used for each. 550 pp. $9 per copy. American Welding Society, 33 W. 39th St., New York 18

"Tungsten Bibliography," by Dr. H. H. Hausner, is a guide to tungsten references appearing in U. S. and foreign publications from 1953 to 1958. Intended for research and development personnel, the book contains 409 references. Each reference includes the author's name along with a brief description of the article and where it appeared. 44 pp. $1.00. Sylvania Electric Products Inc., Chemical and Metallurgical Div, Towanda, Pa.

"A Multitude of Men" by W. D. Smith. Somewhat removed from the proletarian novel of the thirties is this story of the efforts to bring "Craft Steel" into the national steelworkers union. Action moves around Vera Mae Marshall, sexy editor of the company house organ. You'll meet and drink with millworkers and foremen; you see the change from the old rabble-rousing union organizer to the smoother current version. The atmosphere of the mill is here, though you may not agree with it all. $4.95. Simon and Schuster, 630 5th Ave., New York 20.

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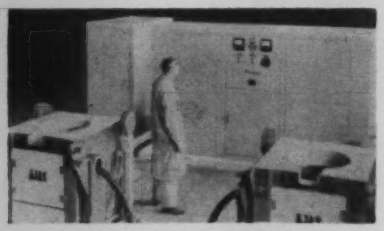
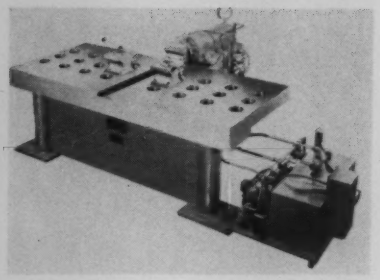


Unit Converts Frequency for Heating and Melting

The use of a static frequency converter is a low cost, efficient method of converting frequency for induction melting and heating applications. The unit changes 3-phase power at 60 cycles, from the ordinary supply line, into single-phase power at 180 cycles. Sizes range from 100 kw to 1000 kw, and units can be paralleled for large power requirements. (Ajax Magnethermic Corp.)

For more data circle No. 61 on postcard, p. 165



Horizontal Press Straightens Tubing

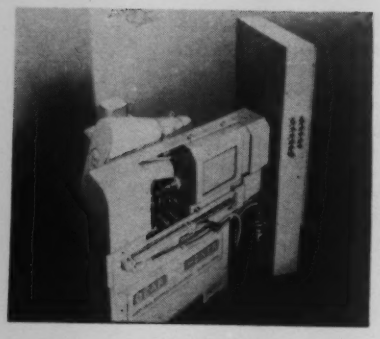
A horizontal press straightens nonferrous tubes. It is a 100-ton, self-contained, hydraulic press with a sensitive hand control. The moving ram face is guided in the dovetail for the full 24-in. stroke. The bed is 48 in. right to left and 108 in. front to back. Two 5-in. diameter pins, with swivels, are employed for different diameter tubes. Nylon liners in swivels protect the high finish on the bed during the straightening operation. A 7½-hp double end motor powers the unit. (K. R. Wilson, Inc.)

For more data circle No. 62 on postcard, p. 165

Computer-Readout Unit Speeds Data Processing

Aimed at coping with the relatively slow print-out speed of data computers, a new printer-plotter system plots out graphical or printed data at 300,000 points per minute from magnetic tape. Mass data normally requiring two to three weeks to process can now be ready for evaluation within a few hours. The system can plot up to 10 curves on a 12-in. continuous chart, at the same time drawing its own grid lines and marking in title blocks. Chart speed is 10 ips. While designed for processing missile data, the unit has many applications, one being the proving out of tapes used in numerical control of machine tools. (Briggs Associates, Inc.)

For more data circle No. 63 on postcard, p. 165



Honing Machine Provides Four Honing Methods

A gear-tooth honing machine gives successful operation by the method of developing work pressure between the honing tool and work gear. The machine provides four separate methods of honing: 1. Honing with backlash, 2. Zero-backlash operation, 3. Constant pressure operation with a mechanical back-up eliminator, and 4. Constant pressure operation with overload relief. The table of the machine pivots on anti-friction bearings, thereby providing crown-honing operation with any of the four methods. Three types of machines are standard (semi-automatic), fully automatic, and manual. (National Broach & Machine Co.)

For more data circle No. 64 on postcard, p. 165

US RUBBER **U. S. ROYAL V-BELTS** from the Power Unlimited complete belt line

Exclusive new process gives

balanced driving power

Now you can give your equipment the kind of driving power that comes only from V-belts that are as close-to-perfect as the world's most advanced manufacturing methods can make them. Specially developed equipment automatically controls thickness, weight, density, length, and tension members so precisely that each U. S. Royal gives you *balanced* driving power that pays off in every aspect of a belt's performance.

Smoother running. Variations inherent in other belts lead to vibration, intermittent slippage, increased bearing wear, excessive heat build-up, and early belt failure. Because of the "balanced driving power" resulting from exclusive manufacturing processes, U. S. Royals are the sweetest running belts in the business.

Unequaled length stability. Test after test has demonstrated that each U. S. Royal V-Belt with balanced driving power is a perfect working match for the others in its set. And every U. S. Royal V-Belt on a multiple drive will *continue* to pull its share of the load long after other "matched" belts have begun to assert their individuality.

No weak spots. Because there are no "weak links," you get longer lasting driving power and greater freedom from maintenance than ever before. Take advantage of the balanced driving power only U. S. Royal V-Belts offer. Your "U. S." Power Transmission Distributor has full stocks to service you promptly.

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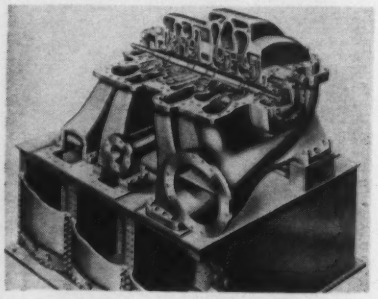
NEW EQUIPMENT

Air Compressor

A high-efficiency, multi-stage, centrifugal air compressor provides "100-lb air" for oxygen plants, centralized air systems, and other industrial air applications. Six case sizes are available with horsepowers ranging from 1000 to 8000 bhp



and capacities from 5000 to 38,000 cfm. Floor space requirements are reduced as much as 40 pct over machines of comparable horsepower; this is due to single case construction and base mounting of the intercoolers. (Clark Bros. Co.)

For more data circle No. 65 on postcard, p. 165

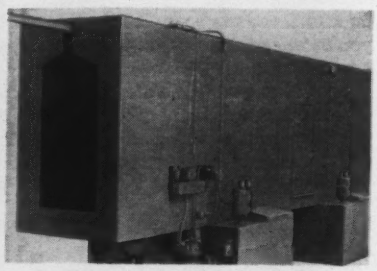
Copying Machine

For office use, a machine copies translucent and semi-translucent originals. The machine features automatic separation of copies from originals before delivery. About the size of a typewriter, it copies small engineering drawings, order - invoices, and general copying. (Charles Bruning Co., Inc.)

For more data circle No. 66 on postcard, p. 165

Power Spray Units

Power spray washing and phosphatizing machines, in conveyorized monorail systems, provide



flexibility to finishing equipment. The unit is sectioned, thereby permitting the addition or modification

General Electric announces the new Adjust-O-Breaker toolholder!

Carboloy® toolholder with adjustable chipbreaker lets you adjust from any angle . . . offers any desired adjustment within its range* . . . features "floating" indexable chipbreaker with absolute repeatability.

MORE jobs with *LESS* tooling—that's what you get with this new Carboloy® Adjust-O-Breaker toolholder! No need to have a separate chipbreaker for every cutting job. No need to restrict yourself to toolholders with only two or three chipbreaker settings. Now you can have this versatile new Carboloy toolholder . . . and *adjust it for any chipbreaker setting within its range.**

Available right now from stock in 5 styles, negative rake, for left- and right-hand machining, the Adjust-O-Breaker truly brings new meaning to disposable tooling.

So, to get cutting tool versatility that lets you handle *more* jobs with *less* tooling, check into the complete Carboloy line—Lift-O-Matic (positive rake, negative rake, and tracer), heavy-duty, and the new Adjust-O-Breaker toolholder. The complete line of Carboloy inserts, insert seats, convertible seats, and brazed tooling is the *broadest* in the industry . . . designed to meet *every* tooling need to give you BETTER PROFITS THROUGH BETTER TOOLING.

See your Authorized Carboloy Distributor now. He's listed in the Yellow Pages. *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Avenue, Detroit 32, Michigan.*

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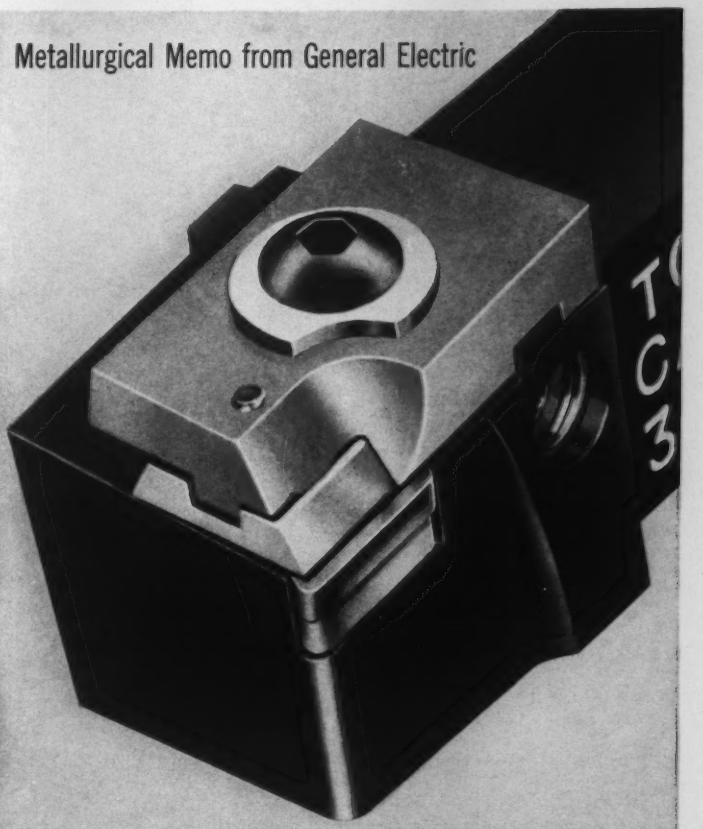
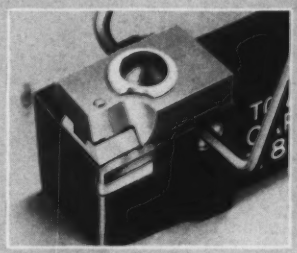
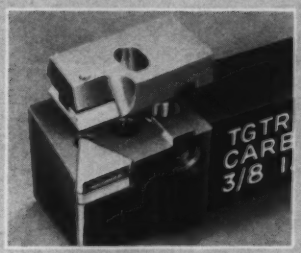
Metallurgical Memo from General Electric



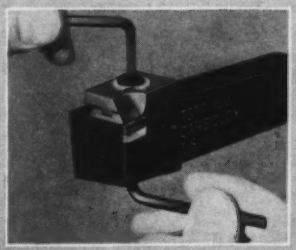
*Sizes 16V and 85V: adjustable range 1/16" to 7/32"
Size 20V: adjustable range 1/16" to 1 1/32"



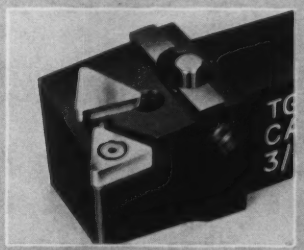
1. Chipbreaker setting adjusts to any width within range.* Set screw with two open ends provides access from either side. No springs to adjust.



2. Design permits absolute repeatability of settings. Floating chipbreaker is indexable. Can't drop out when clamp is loosened.



3. Clamp screw is accessible from top or bottom; allows easy indexing or replacement even when toolholder is vertical or upside down.



4. Standard disposable inserts, Carboloy insert seats and convertible seat are used with toolholder. Insert seats are indexable and self-aligning.

Photograph by Elliott Erwitt

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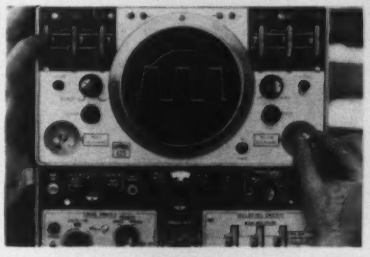
NEW EQUIPMENT

of process stages economically. Time-consuming and costly custom designing is eliminated. Steam heated and gas fired machines are available. (Ramco Equipment Corp., Div. of Randall Mfg. Co.)

For more data circle No. 67 on postcard, p. 165

Oscilloscope

A high-frequency, general purpose oscilloscope features a direct digital reading system. This direct readout system makes it possible for any untrained factory or production worker to use the oscilloscope for accurate, repeatable measurements. The unit can be used directly as a read-in device

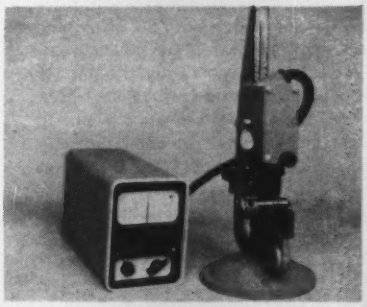


for computers, printers, automatic process control systems, and statistical production analysis. (Allen B. DuMont Laboratories, Inc.)

For more data circle No. 68 on postcard, p. 165

Electronic Comparator

High precision checking and inspection work, calibrating gage blocks, checking parallelism and production runs are some of the operations possible with an elec-



tronic comparator. Featured are: elimination of electronic drift, regardless of atmospheric changes or line voltage fluctuations, stability within one millionth of an inch,

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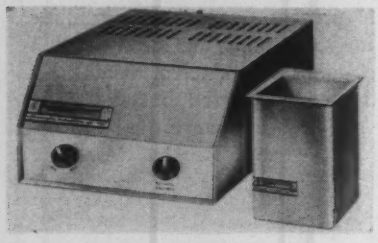
LIBERTY at 25TH PITTSBURGH 22, PA.

a lightweight gage stand, and a tension adjustment not varying more than 1 g per 0.0001 in. displacement. (EAM Corp.)

For more data circle No. 69 on postcard, p. 165

Ultrasonic Cleaner

Consuming no more current than an ordinary light bulb, an ultrasonic cleaner affords precision cleaning of all types of soils in a matter of seconds. Intricate parts can be cleaned without disassembly. The system includes a 40-watt



generator producing an output of 90,000 cycles per second, and a cabinet measuring 10 x 8 x 5¾ in. The working compartment measures 5¾ x 5¼ x 4 in. (Ultrasonic Industries, Inc.)

For more data circle No. 70 on postcard, p. 165

Milling Machine

A dovetail, ram and turret, vertical toolroom milling machine features a compound swivel head. The swivel provides for double angle settings; a protractor type scale facilitates angular settings.

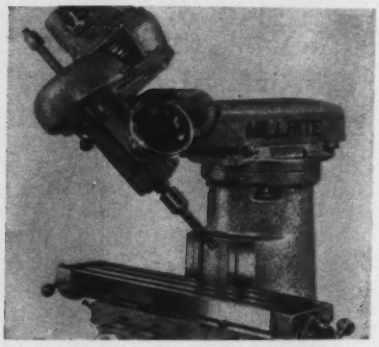
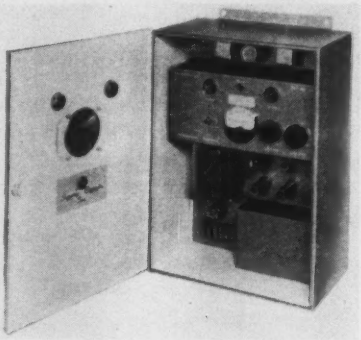


Table feeds are: longitudinal 16 in., crossfeed 8 in. Providing universal flexibility, the vertical mill with compound swivel, maintains accuracy to accepted machine tool tolerances, and increases its productivity. (U. S. Burke Machine Tool Co.)

For more data circle No. 71 on postcard, p. 165

Electronic Control

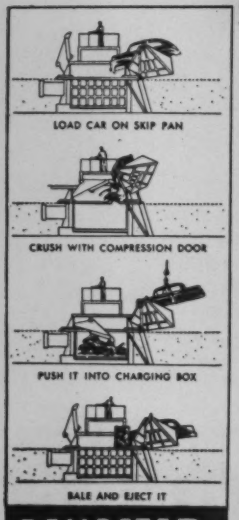
The use of an electronic control provides protection to machines and machine operators without contact. Components are a sensing element or antenna, connected by a



coaxial cable to a key-locked, shock-mounted, gasketed enclosure. The control allows the work area to be fully accessible and unobstructed. Any undesirable object

New Power Packed "750 CS" Bales Car Bodies in Just 3 Minutes

Exclusive New **"RAM-PAN LOADER"** SPEEDS PRE-BALING WORK



LOW-INVESTMENT BALESTER DOES WORK OF BIGGER PRESSES

In a feast-or-famine market, versatile equipment pays off! That's the reason for the new 750-CS which handles smaller scrap with unbeatable efficiency and bales car bodies at a pace only slightly off that of the big expensive presses. The powerful new "Ram-Pan Loader" with the curved bottom fits the arc of the compression door as it pushes the car down into the charging box, a pre-baling operation that takes less than a minute and reduces costly cutting or shearing work. All told, you've got a tight compact bale in *less than three minutes!* You'll like the many other new features of the 750-CS.

Mfd. By DEMPSTER BROTHERS, Inc.

WRITE TODAY FOR NEW BULLETIN ON 750-CS

DEMPSTER BROTHERS, Dept. IA-2
Knoxville 17, Tenn.

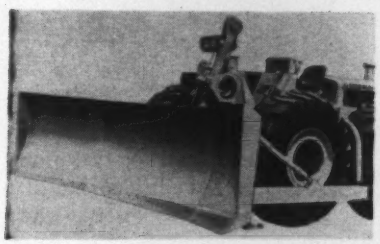
DEMPSTER BALESTER

entering the forbidden zone actuates a relay in the control cabinet bringing the machine to an immediate stop. (Security Controls, Inc.)

For more data circle No. 72 on postcard, p. 165

Coal Handling Blade

A coal handling blade manipulates 50 pct more material than the conventional dozer blade. The blade measures 15 ft from end to end bit, and is 4½ ft. high. The added size of the blade causes the

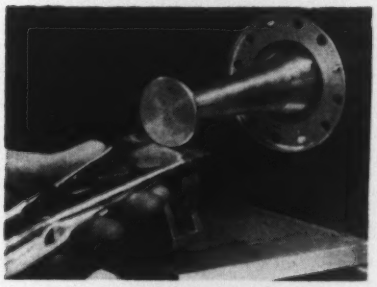


coal to keep a live rolling action ahead of the machine, thus cutting down on resistance. The blade is an optional accessory for the company's rubber-tired tractor. (LeTourneau-Westinghouse Co.)

For more data circle No. 73 on postcard, p. 165

Ultrasonic Welder

A rotary tip ultrasonic foil welder operates on the principle of high frequency sound waves. It welds metals such as aluminum foil, where surface oxidation or welding heat

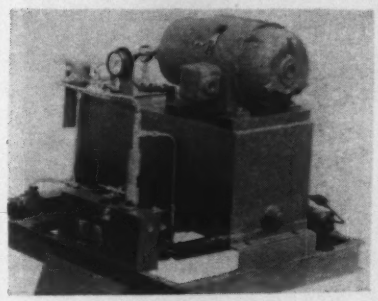


is a deterring factor to standard welders, and metals with high electrical conductivity. The welder is ideally suited for welds on flat or semi-circular sheets. (Vibro-Ceramics Div., Gulton Industries, Inc.)

For more data circle No. 74 on postcard, p. 165

Gas Compressor

Consisting of a hydraulically driven booster compressor, hydraulic power unit, and a cycling control package, the unit provides average gas flow rates of 16 scfm.



There is no need to introduce oil or other lubricants into the gas system. Hydraulic power units are available in the following pump-motor ranges: 4.8 gpm/7.5 hp, 6.5 gpm/10 hp, and 9.3 gpm/15 hp. (Haskel Engineering & Supply Co.)

For more data circle No. 75 on postcard, p. 165

Rheostat Foot Switch

The opportunity, for operators of variable speed equipment to change speeds, is possible with the use of a rheostat foot switch. Both hands remain free for work. With a mani-

GOLD STAR SR

This d-c rectifier type welder does more things better than any other welder of its class because —

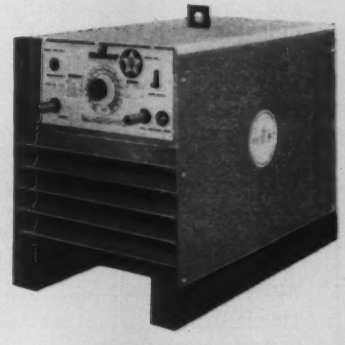
a. Its new transformer (Miller designed and built) has integral flux diverter.
b. Its new weld stabilized circuit delivers the ultimate in speed of metal deposition.
c. Its new completely sealed semi-metallic rectifier — designed for welding — provides the most efficient d-c for welding ever devised.

These features contribute to the Gold Star SR's greater arc stability, denser welds, easy arc starting and flexibility to handle all electrodes in all positions.

Performance-proved wherever profits are important, the Gold Star SR is available in single and duplex models of 200 to 1200 amperes at 60% duty cycle ratings.

miller WELDERS

GOLD STAR
All-Weather
SRH

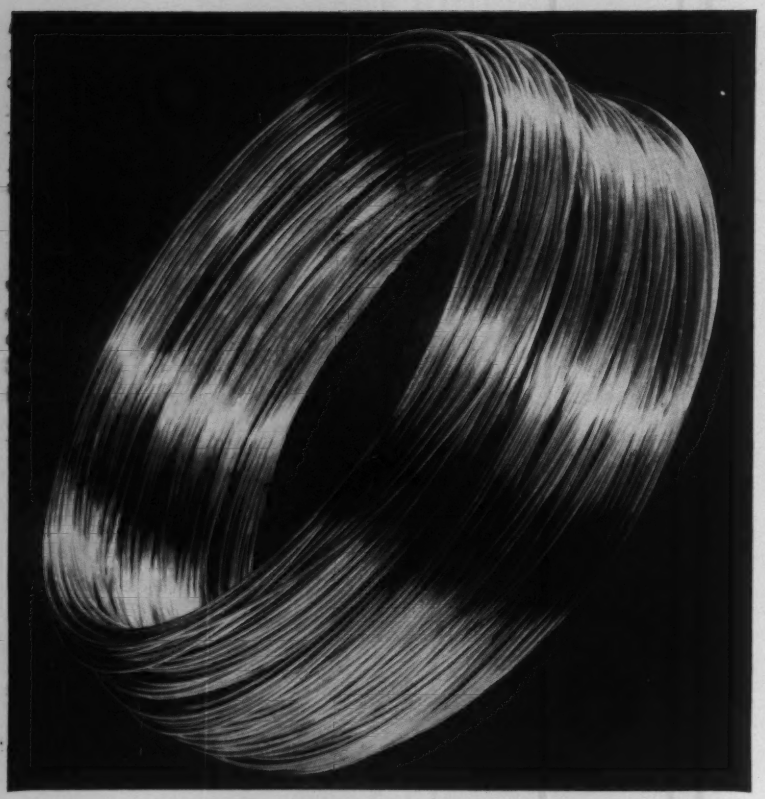


The features that set the SR above and beyond the normal standards of welder performance belong to the SRH also. But, in addition to the horizontal design for easier stacking and paralleling, this welder has an "all-weather" construction that includes baked varnish coated transformers and rectifiers plus phosphatizing and painting of all base and sheet metal — even fan blades. Cam-Lok receptacles are standard equipment. The Gold Star SRH welds real well.

Complete specifications on these Gold Star models will be sent promptly.

miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN

• Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal



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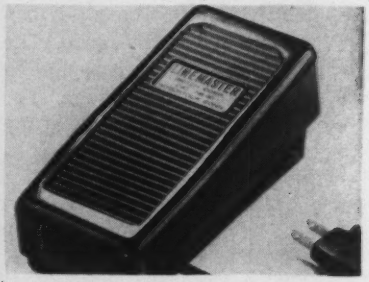
NEW EQUIPMENT

mum resistance of 350 ohms, the unit is rated at 0.8 amps at 125 v, ac or dc. Designed for operation by users in a seated position, the foot switch comes with a 6-ft, 18/2

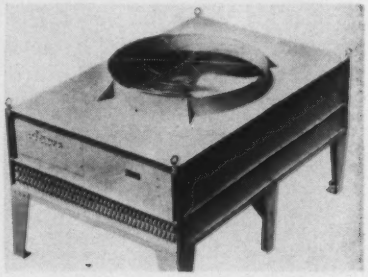


cord set, with molded-on-two-prong series plug for insertion into the driving unit. (Linemaster Switch Corp.)

For more data circle No. 76 on postcard, p. 165

Air-Cooled Condensers

Horizontally mounted, air-cooled condensers offer less wind resistance and a lower per-square-foot roof loading. The units are rated at 5 to 100 nominal tons capacity, which are constant regardless of



wind conditions. Featured items are: quiet operation, limited control valves for year-round operation, increased efficiency of heat transfer, and a durable, corrosion and abrasion resistant finish. (Acme Industries, Inc.)

For more data circle No. 77 on postcard, p. 165

Water Softener

Weighing only 40-lb, a portable water softener provides treated and soft water for laboratory operations. The softening unit can be connected to laboratory hot water heaters, pipette and glass-ware washing and rinsing equipment, and environmen-

tal test chambers. The unit measures 6½-in. diam and 32 in. high. (Ion Exchange Products, Inc.)

For more data circle No. 78 on postcard, p. 165

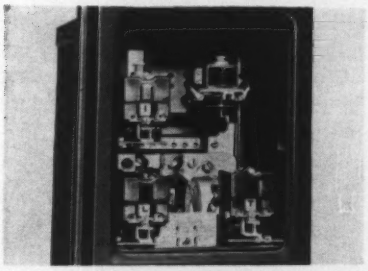
Honing Tools

Honing mandrels and stones are available for bore diameters from 0.100 through 0.118 in., in increments of 0.002 in. Actual range of the mandrels is 0.004 in. for ultra-precision work. The tools are manufactured for use with company's honing machines. (Sunnen Products)

For more data circle No. 79 on postcard, p. 165

Motor Protection Relay

By combining several elements for a closer match to the motor heating curve, a relay provides complete motor protection from very light to heavy overloads. From minimum pickup to 175 pct of tap



value setting, an alarm sounds and allows the operator 5 to 10 minutes to remove the trouble. Another feature is instantaneous tripping on heavy fault current. (Westinghouse Electric Corp.)

For more data circle No. 80 on postcard, p. 165

Heating Unit

An infrared heating unit makes reflected radiant heating practical for almost all indoor and outdoor, open-area applications. Infrared lamps convert about 85 pct of their energy into radiant heat. The unit then projects this heat in the same manner that light is projected; this projected heat can be directed to specific areas. The heating units are particularly suited for use in high-bay buildings where they can be installed to economically project heat to specific work areas. Regardless of surrounding temperatures, any-

PACKAGED AIR HEATERS by THERMAL

Extreme compactness, high efficiency and versatility of operation are the chief characteristics of the THERMAL Type CA direct fired air heater. Designed around the high velocity THERMAL burner, it normally requires no refractory, since combustion is limited almost entirely to the burner itself. Adding to its versatility, the CA air heater performs equally well on gas, oil or combination firing and can be adapted to all pressure levels.

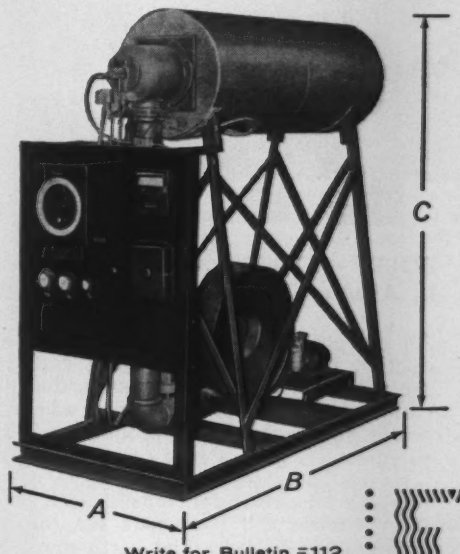
Type CA direct fired

Type CA air heaters are most frequently sold as "packaged" units complete with all necessary safety and control apparatus. These units will provide outputs ranging from 200,000 BTU/hr to better than 30,000,000 BTU/hr and at temperatures from 300F to 1500F or higher.

TYPICAL SIZES . . .

Listed below are the overall dimensions of a few of the dozens of output, temperature, and flow combinations possible in these heaters. Figures are for atmospheric pressure units. Higher pressure heaters would be smaller.

BTU/hr	AIR FLOW scfm	TEMP. IN °F	TEMP. OUT °F	A ft.	B ft.	C ft.
800,000	1,000	60	750 F	2½	4½	4
2,500,000	5,000	60	500 F	4	7	6
4,000,000	16,000	700	900 F	7	11	8
10,000,000	8,500	60	1,000 F	5½	10	8
15,000,000	10,000	60	1,200 F	6	12	8



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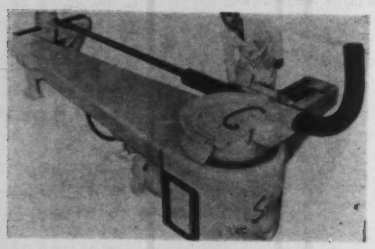
Submerged Combustion
Combustion & Heat Transfer Equipment

one stepping within the area of projection can immediately feel the warmth. (Luminator, Inc.)

For more data circle No. 81 on postcard, p. 165

Bending Machines

A line of hydraulic draw bending machines bends thin wall conduit and tube. The benders operate with internal mandrels and bend to very close radii. Right and left-hand bending with the same tooling, no special foundations for the machine, and easy access to all sub-assemblies for easy maintenance are among its features. (Pedrick Tool & Machine Co.)



For more data circle No. 82 on postcard, p. 165

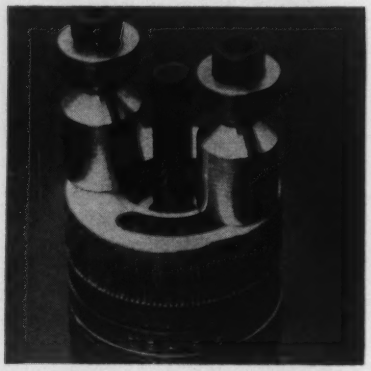
Vacuum Furnace

A high vacuum furnace, for making hardness tests at temperatures up to 3000°F, has a cylindrical heating element of sheet molybdenum 3-in. ID and 12¾ in. long. The loading mechanism is within the vacuum system to eliminate external error. Featured is: indentor movement to make hardness impressions on three reference circles, and 360° rotation of anvil and stage for maximum number of impressions without breaking vacuum. The furnace measures 11-in. OD by 38 in. high. (Marshall Products Co.)

For more data circle No. 83 on postcard, p. 165

Adjustable Guide

Equipped with adjustable guides, a device allows pre-set depth of cut on both curved and straight edges in both air and electric rotary portable grinding operations. Permitting chamfering, deburring, and other machine operations, the guide positions quickly to the desired depth of cut. (A & S Production Tools, Inc.)



For more data circle No. 84 on postcard, p. 165

Plastic Filter

Plastic-weld filters remove the harmful ultra-violet and infrared rays of arc welding. They filter the rays to the same degree as the standards set for glass in federal specifications. Lighter in weight than glass filters, they are available in

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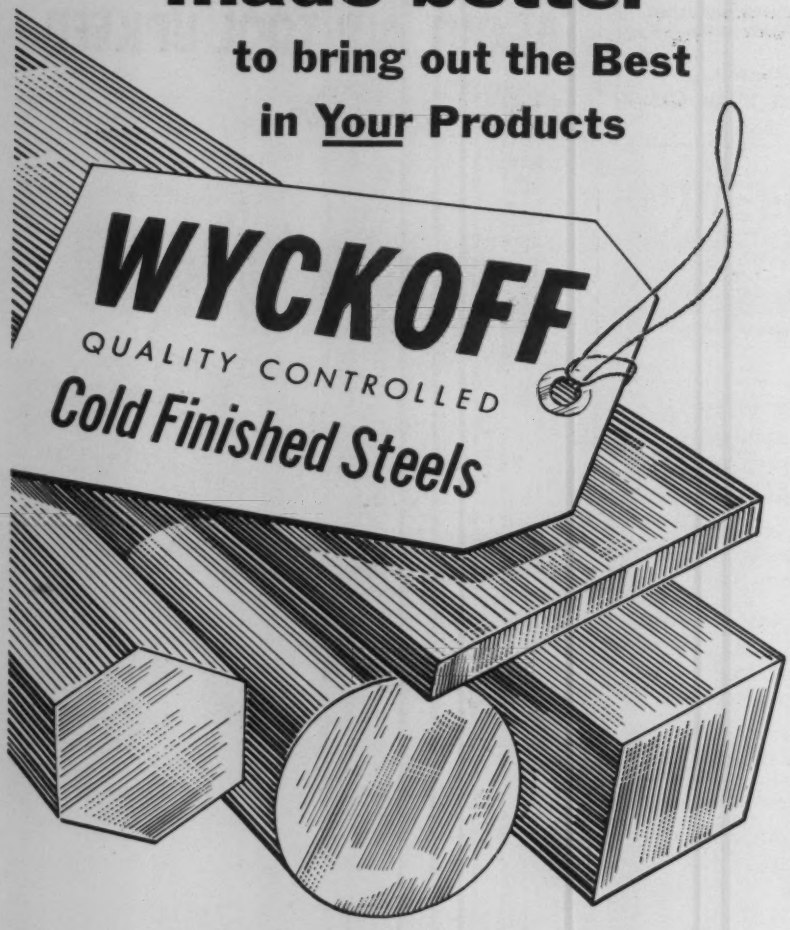

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NEW EQUIPMENT

the 2- x 4½-in. size and a panoramic window version. (Reincke, Meyer & Finn, Inc.)

For more data circle No. 85 on postcard, p. 165

Closing Tools

Incorporating light weight metal, positive closing control, and less operator effort, a line of closing tools offers faster closures on steel containers. The line of tools can handle standard 5-gal pail and grease drum sizes and many other closures. (Grotnes Machine Works, Inc.)

For more data circle No. 86 on postcard, p. 165

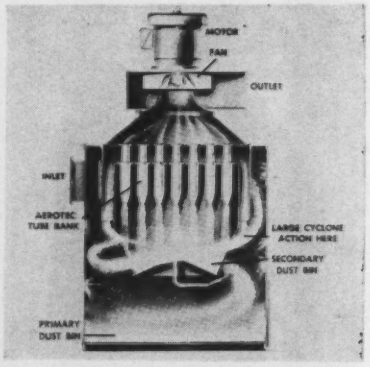
Outdoor Fixture

A weatherproof, fluorescent fixture, designed for outdoor installation, has many indoor applications also. Rigidly constructed, the fixture has a shatterproof plastic lens. The housing is an extruded aluminum channel with cast aluminum end caps. (Crouse-Hines Co.)

For more data circle No. 87 on postcard, p. 165

Dust Collector

An improved integral dust collector removes high concentrations of dust from grinding, buffing, polishing, milling, and cutting operations. Some of the new unit's fea-



tures are: no filter to change, no pressure build up, constant suction at hood, and no fire hazard. The collector is available in seven sizes ranging from 300 to 2100 cfm capacity. (Aerotec Industries, Inc.)

For more data circle No. 88 on postcard, p. 165

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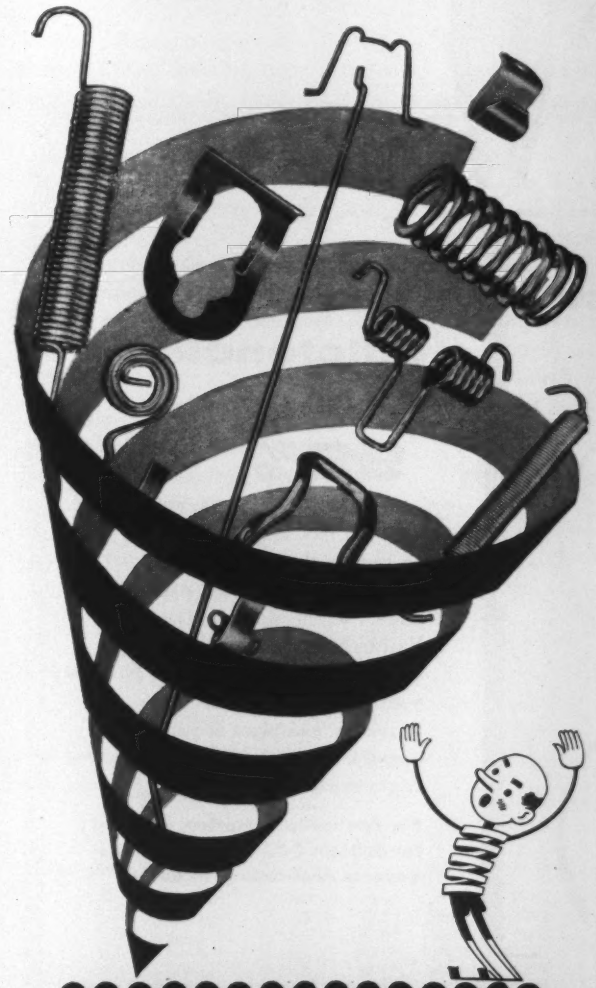
No order too large or too small!



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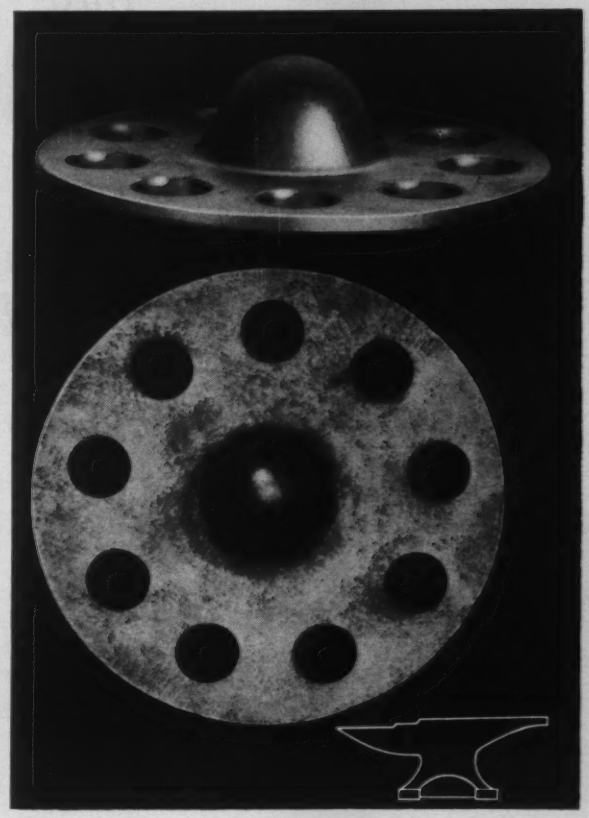

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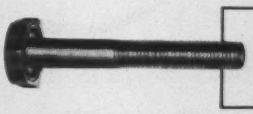

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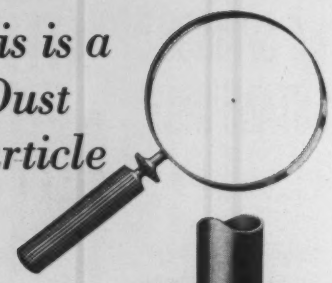
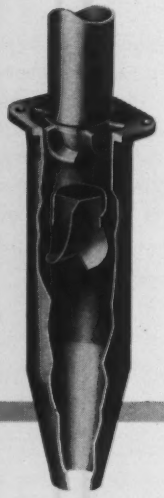
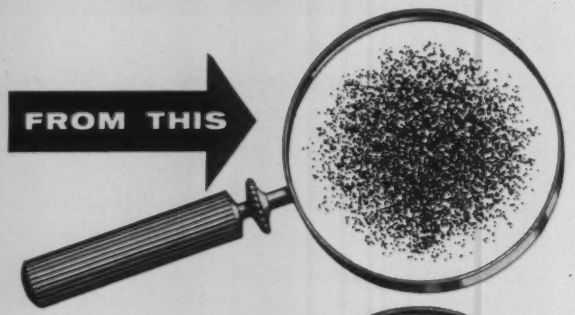
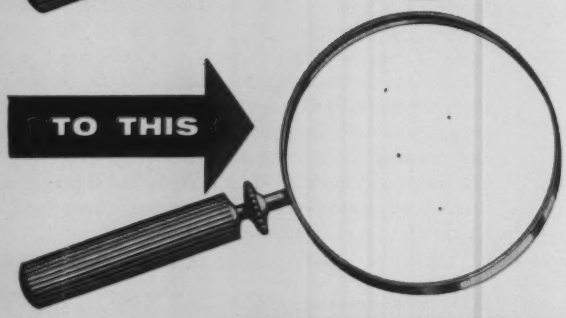


This is a Cyclo-trell Dust Collector →



The Cyclo-trell Dust Collector Cleans Gas with these Dust Particles...





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RC-398

The Iron Age Summary

How Inventories Hit Steel Market

Steel users are determined to keep steel stocks at a workable minimum and to avoid expensive buildup of inventories.

This means an easing in demand for some products in spite of a high rate of steel consumption.

■ The buildup of consumer inventories of steel may lag from 3 million to 5 million tons behind earlier predictions.

The trend of steel users to keep their stocks at a workable minimum will have these effects on the steel market:

A moderate dropoff in steel operating rates in the second quarter.

An early easing in demand and increased availability of many steel products.

Reasons Why — Policies of closely controlling inventories are prompted by a combination of factors. Most important is tight money and high interest rates which discourage the building up and carrying of large stocks.

Another factor is the 30-month steel labor contract. This assures uninterrupted steel operations until 1962.

Also important in inventory plans is the ability of the steel industry to produce and ship enough steel to handle any anticipated steel demand. This makes it unnecessary to carry large supplies as a hedge against a period of strong demand.

Market Implications—The new trend in inventory policies is already affecting the steel market in several ways.

It means less tension in the market; the end of premium-priced steel; liquidation of excess foreign and broker steel at lower prices.

To the steel industry, it means that heavy inventories will have to be carried by the steel mills. And producers will have to be able to handle spot supply troubles as they occur.

Inventory Figures — Earlier, it was anticipated that steel inventories would build up to 16 million to 18 million tons this year. Now, inventories of not more than 13 million to 15 million tons can be counted on.

If this buying philosophy continues, another major steel stock buildup may not occur until early 1962, before the expiration of the steel labor contract.

In spite of inventory caution, the demand for steel remains high and will continue strong well into the second quarter. Steel consumption is still up around 7 million tons a month. Backlogs of orders for most products are close to three months and incoming orders are about 85 pct of present rate of shipments.

Auto Impact—There is some apprehension about automotive production. But, to date, automakers are taking all the steel they can get and are keeping the market tight.

However, reports from Detroit indicate there will be cutbacks in production schedules. Schedule makers are putting January new car figures under a microscope. Belief is that the industry can't produce the original February schedule of 725,000 cars without overloading dealer stocks.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,707	2,693	2,736	2,378
Ingot Index				
(1947-1949=100)	168.4	167.5	170.2	148.0
Operating Rates				
Chicago	97.0	96.0	96.0	88.0
Pittsburgh	96.5	97.0	96.5	80.0
Philadelphia	98.0	100.0*	100.0	90.0
Valley	89.0	90.5*	89.0	79.0
West	87.0	88.0*	90.0	85.0
Cleveland	102.0	100.0	96.0	83.0
Detroit	94.0	79.0*	105.0	95.0
Buffalo	105.0	105.0	105.0	100.0
South Ohio River	103.0	103.0	100.0	91.0
South	92.0	92.0	93.5	73.0
Upper Ohio River	97.0	93.0*	91.0	83.0
St. Louis	90.0	92.0*	92.5	82.5
Aggregate	95.0	94.5	96.0	84.0

*Revised

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$40.58	$42.17	$41.50	$43.83
No. 2 bundles	$26.50	$28.17	$28.17	$30.33
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	30.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	100.875	100.50	99.50	102.375
Zinc, E. St. Louis	13.00	13.00	13.00	11.50

New Service to Aid Foundries

Gray Iron Founders Society, Inc., and Design for Industry, Inc., have begun a new foundry service.

It will help solve design and engineering problems that founders cannot solve themselves.

▪ Purchasing agents and product designers looking for competent unbiased advice on castings have a new service available.

An independent design firm, Designers for Industry, Inc., Cleveland, is cooperating with Gray Iron Founders Society, Inc., to advise on and design castings for the metalworking industry. Castings users can send their problems or ideas to the Society.

Each problem will be screened and forwarded to Designers for Industry. This engineering firm will evaluate the project. If some design work is indicated, they will do it on a paid consulting basis with the castings user. This is transacted between the user and the design firm.

Result of Clinics — "This has come about as a result of our castings marketing and design clinics," says Don Workman, GIFS executive vice president. "We found that many purchasing agents told us their firms didn't have competent castings designers. Neither could they get complete casting design service from their foundry supplier."

The GIFS clinics were held in several cities last year and were eagerly accepted by founders. Most men attending the clinics were introduced to new casting methods and changes that they didn't know existed.

"Many asked where they could get sound and unbiased advice. This will serve as an agency for them to use. Our members will also be able to tell customers there is now a neutral service available to them. As far as we know this is the first large organized firm to go specifically into castings design."

Businesslike Manner — Society headquarters in Cleveland have for years been receiving crates of castings, blueprints and patterns when users were in trouble from faulty castings. If an answer could be found without time consuming research, it was handled there. With the new arrangement, it can be done in a businesslike manner.

Designers for Industry is a 25-year-old company which started as an industrial design firm. It has now spread into electronics, missile programming, steel mill measuring devices and other products.

Redesigning and Building—Executive secretary Ervin J. Osterhus says that in the castings field the firm has re-designed machine tools for customers, including cast components, and designed and built special automatic assembly machines for packaged items. It has a direct design staff of 125 of whom two-thirds are engineers. Its plant includes a machine shop with experienced machinists, a welding shop and sheet metal shops. In addition there are facilities for shock, vibration, impact and environmental testing.

Government business constitutes about 50 pct of the firm's volume. It includes items like a secondary frequency standard timing mechanism for programming missile operations, a programmer for missile firings, steel and paper mill measuring devices.

ENGINEERS AT WORK: The engineering staff of Design for Industry, Inc., works on projects for founders and other industries.

UNDERWOOD'S "IMPOSSIBLE" INSPECTION PROBLEM

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Price Cutting Hits More Warehouses

U. S. Steel Supply revised its price structure in Cleveland, Pittsburgh and St. Paul.

Ryerson has changed prices at its service centers in Cleveland, Houston and Dallas.

▪ Adjustment of prices by steel service centers continues to spread. U. S. Steel Supply Div. of United States Steel Corp. revised its prices for extras in three cities—Cleveland, Pittsburgh, and St. Paul. U.S. Steel Supply says this has the effect of a $1 a ton decrease for the average customer.

Joseph T. Ryerson & Son Div. of Inland Steel Co. made similar changes in Cleveland prices effective Feb. 11. At the same time, changes in extra charges at Ryerson warehouses in Houston and Dallas have lowered prices in those areas even more than the Cleveland reductions. Those prices became effective Feb. 6.

Began in January—Price cutting and juggling began last month when U. S. Steel Supply trimmed prices in St. Louis. Ryerson cut prices an average of $1 a ton in Pittsburgh and Buffalo, effective Jan. 25.

The price maneuvers, while local in nature, are a reaction to price cutting and special deals being offered customers by the smaller and independent warehouses. At the same time as meeting competitive factors in the trade, the price changes also reflect some easing of demand for steel at service centers. While there is still some shortness in supplies of flat-rolled products, sales at service centers have reached a plateau.

Sheet and Strip — While automakers have tentatively scheduled production of 725,000 units in February, they may back off from that figure before the month is out. There are reports that January sales, despite running ahead of a year ago, have been a disappointment. However, there is no evidence that an easing of auto production will immediately bring a proportionate decrease in demand for sheet and strip mill products. High levels of production have retarded inventory buildups.

Mills in **Pittsburgh** report automakers are still trying to get all of the steel they can for February and March. And the auto industry has assured steel producers its needs for the second quarter will continue to be substantial. Cold-rolled sheet order books are just about filled through the first half, or about as far as books are open, in **Cleveland** and the **Midwest.** However, hot-rolled sheet is slightly more flexible, with spot tonnages opening up where cold mills can't absorb them.

PURCHASING AGENT'S CHECKLIST

Air freight companies are out to attract more business from metalworking companies. P. 105

Aluminum Co. of America takes market steps aimed at developing big tonnage users. P. 108

Streamlining paperwork is a good way to cut costs, Farwest company finds. P. 127

Appliance manufacturers are working heavy schedules and are maintaining their demands for cold-rolled sheets. All are asking for extra tonnage for the second quarter.

While there has been no appreciable lessening of demand, there are fewer instances where customers are pressuring mills for spot shipments. To this extent, the sheet market has eased.

Bars — Customers in the **Midwest** have indicated they will take their full quotas of bars for the next several months. Most mills indicate they are booked solidly through most of the second quarter. Cold-finished bars are tighter than hot-rolled, and capacity in the area is just about tied up for all of the first half.

A shortage of hot-rolled bars in **Cleveland** continues to keep supplies of cold-finished bars tight in the area. Bar mills have only a small remaining tonnage uncommitted for April, and salesmen are working on that. Cold-finished bars under 1-in. are in short supply in **Detroit.**

In **Pittsburgh,** bar mills are experiencing a heavier demand than they can handle for February and March. April bookings are only about 20 pct of the expected tonnage, but this isn't considered significant so far in advance of order deadlines.

Shapes and Plate—No easing of demand for wide flange structurals or wide plate is expected for the first half in the **Midwest.** However, heavy plate mills in the **East** report some scattered holes in February and March books.

Light plate is a different story. Inventories are beginning to pile up on users in the **East.**

Spiegeleisen Prices—Dual prices now exist for 35 lb spiegeleisen. Price reductions announced by New Jersey Zinc Co. have not been followed by Pittsburgh Coke & Chemical Co. New Jersey Zinc is now also quoting prices on 10 lb pigs of spiegeleisen. (Complete prices are on p. 213.)

COMPARISON OF PRICES

(Effective Feb. 9, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Feb. 9 1960	Feb. 2 1960	Jan. 12 1960	Feb. 10 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.00	14.00**	14.00**	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Feb. 9 1960	Feb. 2 1960	Jan. 12 1960	Feb. 10 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.87
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00	11.00	12.25	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$42.50*	$44.50	$43.50	$47.50
No. 1 steel, Phila. area	40.50*	41.50	41.50	39.50
No. 1 steel, Chicago	38.75*	40.50	39.50	44.50
No. 1 bundles, Detroit	39.50*	41.50	39.50	40.50
Low phos., Youngstown	46.50*	48.50	48.50	49.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	51.50
No. 1 mach'y cast, Phila.	54.50	54.50	54.50	56.50
No. 1 mach'y cast, Chicago	59.50*	61.50	60.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$40.58*	$42.17	$41.50	$43.33
No. 2 bundles	26.50*	28.17	28.17	30.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	30.00
Copper, Lake, Conn.	33.00	33.00	33.00	30.00
Tin, Straits, N. Y.	100.875†	100.50	99.50	102.375
Zinc, East St. Louis	13.00	13.00	13.00	11.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites
Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Prices Break In Uneasy Market

Prices tumbled this week in many market areas, although trading was light.

Buyers are calling the turn on prices with dealers growing more pessimistic.

▪ The market continued downward this week. Although activity was limited, prices broke in many market areas.

Reasons were varied. Growing uneasiness about business conditions had a dampening effect on the market. So did reports the steel market was showing signs of easing faster than expected.

Last week's large automotive and industrial lists also contributed to the market weakening. In many cases, mills are able to fill scrap needs from industrial offerings. Scrap has piled up in dealer yards.

Buyer's Market — Dealer optimism has declined in the last few weeks. Brokers, in some cases, have temporarily deserted the market. Steel mills continue buying only limited tonnages and calling the turn on prices.

Export buying, while still active, is not supporting the market as strongly as before. Most February orders have been filled and dealers are now waiting for March sales.

Pittsburgh—Prices broke sharply downward as the sellers outnumbered the buyers by a large margin. Early railroad lists attracted little interest from large brokers. As a result, prices eased off slightly on these grades. Crushers dropped their prices for turnings. Major new orders from mills are lacking in this market. Large industrial offerings in the past two months have allowed mills to pull in heavy tonnages without draining dealer yards or leaving brokers in a short position. This movement has left the market without mill or broker support at a time when bearish reports about the second quarter are causing general concern.

Chicago—Prices dipped sharply in a dull market. Heavier mill purchases earlier, plus less customer pressure for finished steel products, dropped mill offering prices for scrap. As a result, the flow of scrap dried up. Dealers are offering material for sale out of the district. Some has already been sold to out-of-the-area mills.

Philadelphia—Limited mill buys of prime steelmaking grades were at lower prices. The market has a weaker tone, although trading is not on a wide scale. Prices paid for No. 1 heavy melting were $1 below previous sales. Export orders for February have been filled. Dealers are now waiting for March orders. There is some feeling the export market may also be weakening.

New York—Buyers are resisting any price increases. Dealers are beginning to wonder where the predicted boom after the steel strike has disappeared. Domestic mill buying continues at respectable, but not spectacular levels. Export sales are firm.

Detroit—The market has a bearish tone, although trading is light. The feeling is that when the next trading wave comes, prices will drop. Dealer optimism has dwindled since January. Industrial scrap output will be high through March, despite coming cutbacks in auto production.

Cleveland—Dealer scrap is going begging locally and in Valley markets. The market is off $2 a ton on appraisal. Auto scrap is filling most needs. As the market declines, mills and brokers may increase their buying. Turnings tonnages are piling up.

St. Louis—With scrap supplies exceeding demand, the market is weak. Price declines are expected. Mills are doing some buying but only at the prices they set. Railroad grades dropped $1. Cupola cast was also down $1.

Cincinnati—Prices are off $1 a ton in a delayed reaction to declines in other areas. Earlier high prices by area mills brought heavy shipments. Some brokers have pulled out of the market temporarily.

Birmingham — Market is quiet. Despite reports of weakness in other areas, dealers and brokers look for little change in prices. Large tonnages offered by a railroad last week were poorly received. All the bids were turned down as too low.

Buffalo—Prices remain firm at existing levels. The market is generally inactive with only token sales. Little change is expected by dealers and brokers until the spring shipping season on the Lakes resumes.

Boston — Neither domestic nor export buyers are active in the market. Prices dropped slightly. No. 1 heavy melting, No. 1 bundles, and No. 1 busheling were all down 50¢ to $34.50 to $35.50. Turnings grades fell $1.

West Coast — Top steelmaking grades declined $2 a ton in San Francisco and $3 a ton at Los Angeles. The reason was basic: A lack of mill buying.

Houston—Market is in the doldrums. Export is still fairly active, but there are some signs even this may taper off soon. Dealers have cut down on their purchases.

SCRAP PRICES *(Effective Feb. 9, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$42.00 to $43.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	49.00 to 50.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	28.00 to 29.00
Low phos. punch'gs plate	50.00 to 51.00
Heavy turnings	36.00 to 37.00
No. 1 RR hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	58.00 to 59.00
Rails 2 ft and under	63.00 to 64.00
RR specialties	57.00 to 58.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast	50.00 to 51.00
Heavy breakable cast.	48.00 to 49.00
Stainless	
18-8 bundles and solids	230.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$38.00 to $39.50
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	39.00 to 40.00
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	38.00 to 39.50
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. forge crops	54.00 to 55.00
Low phos. punch'gs plate, ¼ in. and heavier	50.00 to 51.00
Low phos. 2 ft and under	48.00 to 49.00
No. 1 RR hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	55.00 to 56.00
Rerolling rails	63.00 to 64.00
Rails 2 ft and under	61.00 to 62.00
Angles and splice bars	53.00 to 54.00
RR steel car axles	59.00 to 60.00
RR couplers and knuckles	50.00 to 51.00
No. 1 machinery cast.	59.00 to 60.00
Cupola cast	52.00 to 53.00
Cast iron wheels	47.00 to 48.00
Malleable	61.00 to 62.00
Stove plate	49.00 to 50.00
Steel car wheels	50.00 to 51.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	120.00 to 125.00
430 turnings	60.00 to 65.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	22.00 to 23.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	22.00 to 23.00
Shoveling turnings	26.00 to 27.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	46.00 to 47.00
Low phos. 2 ft punch'gs	48.00 to 49.00
Elec. furnace bundles	46.00 to 47.00
Heavy turnings	34.00 to 35.00
RR specialties	50.00 to 51.00
Rails, 18 in. and under	67.00 to 68.00
Cupola cast	41.00 to 42.00
Heavy breakable cast.	46.00 to 47.00
Cast iron car wheels	50.00 to 51.00
Malleable	65.00 to 66.00
No. 1 machinery cast.	54.00 to 55.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	20.00 to 21.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Low phos. 18 in. and under	49.00 to 50.00
Rails, random length	51.00 to 52.00
Rails, 18 in. and under	60.00 to 61.00
No. 1 cupola cast.	48.00 to 49.00
Hvy. breakable cast.	40.00 to 41.00
Drop broken cast.	57.00 to 58.00

Youngstown

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	35.50 to 36.50
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	20.50 to 21.50
Shoveling turnings	25.50 to 26.50
Low phos. plate	46.00 to 47.00

Cleveland

No. 1 hvy. melting	$40.50 to $41.50
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	40.50 to 41.50
No. 1 factory bundles	46.00 to 47.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	40.50 to 41.50
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Cut structural & plates, 2 ft & under	48.00 to 49.00
Drop forge flashings	40.50 to 41.50
Low phos. punch'gs plate	41.50 to 42.50
Foundry steel, 2 ft & under	41.00 to 42.00
No. 1 RR hvy. melting	45.00 to 46.00
Rails 2 ft and under	60.00 to 61.00
Rails 18 in. and under	61.00 to 62.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	57.00 to 58.00
No. 1 machinery cast.	57.00 to 58.00
Stove plate	48.00 to 49.00
Malleable	62.00 to 63.00
Stainless	
18-8 bundles	215.00 to 225.00
18-8 turnings	100.00 to 110.00
430 bundles	120.00 to 125.00

Buffalo

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 busheling	36.00 to 37.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	20.00 to 21.00
Low phos. plate	44.00 to 45.00
Structurals and plate, 2 ft and under	44.00 to 45.00
Scrap rails, random lgth.	42.00 to 43.00
Rails 2 ft and under	52.00 to 53.00
No. 1 machinery cast.	51.00 to 52.00
No. 1 cupola cast.	47.00 to 48.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	18.50 to 19.50
Shoveling turnings	20.50 to 21.50
Cast iron borings	25.00 to 26.00
No. 1 RR hvy. melting	43.50 to 44.50
Rails, random lengths	51.00 to 52.00
Rails, 18 in. and under	56.00 to 57.00
Angles and splice bars	49.00 to 50.00
RR specialties	48.00 to 49.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	45.00 to 46.00
Stove plate	44.00 to 45.00
Cast iron car wheels	48.50 to 49.50
Rerolling rails	60.00 to 61.00
Unstripped motor blocks	45.00 to 46.00

Birmingham

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	25.00 to 26.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	41.00 to 42.00
Elec. furnace, 3 ft & under	39.00 to 40.00
Bar crops and plate	44.00 to 45.00
Structural and plate, 2 ft	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	53.00 to 54.00
Rails, 18 in. and under	57.00 to 58.00
Angles and splice bars	49.00 to 50.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast.	53.00 to 54.00
Stove plate	53.00 to 54.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	42.00 to 43.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	22.00 to 23.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	36.00 to 37.00
Heavy breakable cast.	37.00 to 38.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	38.00 to 39.00
Drop forge flashings	38.00 to 39.00
Machine shop turn.	17.00 to 18.00
Mixed bor. and turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Heavy breakable cast.	40.00 to 41.00
Mixed cupola cast.	47.00 to 48.00
Automotive cast.	52.00 to 53.00
Stainless	
18-8 bundles and solids	210.00 to 215.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	105.00 to 110.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.50 to $35.50
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	34.50 to 35.50
No. 2 bundles	18.00 to 19.00
No. 1 busheling	34.50 to 35.50
Machine shop turn.	11.00 to 12.00
Shoveling turnings	15.50 to 16.50
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	41.00 to 42.00
Mixed cupola cast.	36.50 to 37.50
Heavy breakable cast.	35.50 to 36.50

San Francisco

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	34.00
No. 1 dealer bundles	34.00
No. 2 bundles	22.00
Machine shop turn.	$19.00 to 20.00
Cast iron borings	19.00 to 20.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	35.00
No. 1 dealer bundles	34.00
No. 2 bundles	20.00
Machine shop turn.	$17.00 to 18.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Elec. furn. 1 ft and under (foundry)	49.00
No. 1 cupola cast.	46.00 to 47.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Bush., new fact., prep'd.	32.25
Bush., new fact., unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Cast scrap	$46.50 to 48.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	36.00
No. 2 bundles	26.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate 2 ft & under	$47.00 to 48.00
Unstripped motor blocks	34.00 to 35.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	31.00 to 32.00

Tin Market Steady, But How Long?

Prices and supply are in comparative equilibrium. This condition should last into the second quarter.

But after that, some long-range problems loom in world tin markets.

■ The tin market is moving along on an even keel. Good supplies of metal are available and demand, especially from tinplate makers, is also good. These combine to keep the price level steady.

But there are some indications that this placid market will change in the second quarter.

Pattern Changes—For one thing, the buying pattern will change. Steel companies went into their strike with heavy inventories of tin. This was largely used up in the initial burst of tinplate production after the strike ended.

They've been active in the market since, but some traders think they have rebuilt their inventories fairly close to where they want them. Then, too, there is the psychological factor.

Will Buying Lag?—Most of their buying has been at about $1 per lb or slightly under. When the price gets over $1, there usually is a temporary lag in orders. Buyers like to take stock of the market and tend to make careful appraisals of their stocks.

In recent months, these breathing spells have been followed by brisk business. But now there is some doubt that the U. S. tinplate business will boom quite as much in 1960 as was expected originally. This may mean a more pronounced sag.

European Factors—In the other direction, demand for tin in Europe has been especially strong in recent months. While this hasn't pushed up the price at the smelters, it has shifted the pattern of shipments.

For example, from Singapore, bellwether smelter of world tin trade, 2417 tons of the total 4929 tons shipped in January are headed for the U. S. In December, the U. S. got about one-third of the 3771 tons shipped.

ITC Moves — Major factor in continued stability is the International Tin Council, an organization of the world's major tinmakers and users, the U. S. excluded. But consumers here are paying about 10¢ per lb for stability now.

ITC has set up export quotas for producting countries, which, according to the trade, are holding the market stable at about $1 per lb. It would be about 90¢ in an ungoverned market, it is believed.

Feeling is that the ITC has been the major factor in keeping the price within a fairly tight spread in the last year. It should be able to continue doing this, but some tight spots could develop.

Long-Range Outlook — On the long range, there are some problems of supply in the making. One State Dept. expert on Malaya warns that there has not been enough prospecting for new mines. ITC reports: "Prospecting for tin is not allowed except under licenses or permits issued by the government. Prospecting has been severely restricted for 25 years. . . . New mining areas will have to be located unless mining is to be restricted in the not too distant future."

In Bolivia, the third largest world tin producer and the major source in this hemisphere, trouble apparently is brewing. ITC points out that no new mines have been developed in recent years.

Reynolds Appeals FTC Ruling

The Federal Trade Commission has taken a cool attitude toward moves by the basic aluminum producers into fabrication and conversion. (See P. 108.)

This is one conclusion based on the FTC's order to Reynolds Metals to sell Arrow Brands, Inc., a former customer and supplier of aluminum foil to the florist industry.

Reynolds immediately branded the ruling as "wrong" and said it will appeal. Gustav B. Margraf, Reynolds vice president, said, "Instead of there being less competition since the acquisition of Arrow Brands, there is more competition than ever before."

Tin prices for the week: Feb. 3—100.375; Feb. 4—100.50; Feb. 5—100.75; Feb. 8—100.875; Feb. 9—100.875.*

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	35.00	33.00	12/23/59
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/58
Titanium sponge	150-180	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 205.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	⅜-⅝	¾-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Munts Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	53.21	.....
Phos. Bz. 5%	77.44	.....	78.19	.....

Free Cutting Brass Rod..... 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $7.25-$8.50; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$6.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $7.55-$9.50; Bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $74.75
Beryllium copper, per lb conta'd Be..$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots .....$ 2.25
Cadmium, del'd .....$ 1.50
Calcium, 99.9% small lots .....$ 4.55
Chromium, 99.8% metallic base ...$ 1.31
Cobalt, 97-99% (per lb) ...$1.75 to $1.82
Germanium, per gm, f.o.b. Miami, Okla., refined .....29.95 to 36.95
Gold, U. S. Treas., per troy oz....$35.00
Indium, 99.9%, dollars per troy oz. $ 2.25
Iridium, dollars per troy oz....$75 to $85
Lithium, 98% .....$9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York .....$211 to $214
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium .....$137 to $140
Silver ingots (¢ per troy oz.).....91.375
Thorium, per kg. $43.00
Vanadium .....$ 3.45
Zirconium sponge .....$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 30.75
- No. 120 ..... 29.75
- No. 123 ..... 28.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 44.00
- No. 215 ..... 40.75
- No. 245 ..... 36.00

Yellow ingot
- No. 405 ..... 24.75

Manganese bronze
- No. 421 ..... 29.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 26.25-26.50
- 0.60 copper max. 26.00-26.25

Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...26.00-26.25
AXS-679 (1 pct zinc) 25.00-26.00

Steel deoxidizing aluminum notch bar granulated or shot
- Grade 1—95-97½% 25.25-26.25
- Grade 2—92-95% 24.00-25.00
- Grade 3—90-92% 23.00-24.00
- Grade 4—85-90% 22.50-23.50

(Effective Feb. 9, 1960)

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22½	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 29¼
- No. 2 copper wire 26
- Light copper 23¾
- *Refinery brass 24¼
- Copper bearing material 23½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 27½
- No. 2 copper wire 25¾
- Light copper 23½
- No. 1 composition 22½
- No. 1 comp. turnings 22
- Hvy. yellow brass solids 16¼
- Brass pipe 16¼
- Radiators 17½

Aluminum

- Mixed old cast. ..... 14½—15¼
- Mixed new clips ..... 17 —17½
- Mixed turnings, dry ..... 15 —16

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 26¼—26¾
- No. 2 copper wire ..... 22¾—23¼
- Light copper ..... 21¼—21¾
- Auto radiators (unsweated). 14¼—14¾
- No. 1 composition ..... 18½—19
- No. 1 composition turnings.. 17 —17½
- Cocks and faucets ..... 14¾—15
- Clean heavy yellow brass ... 12¾—13¼
- Brass pipe ..... 14¾—15
- New soft brass clippings .... 15 —15¼
- No. 1 brass rod turnings .... 12¼—12½

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3 B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3,* $114.00 *T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1;* *C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.00 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

(Effective Feb. 9, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*			7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective Feb. 9, 1960)

*7.425 at Sharon-Niles is 7.225

STEEL PRICES

Italics identify producers listed in key at end of table. **Base prices**, f.o.b. mill, in cents per lb., unless otherwise noted. **Extras apply.**

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr'a. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.075 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3* 6.475 *T5*	9.025 *R3,R2* 8.775 *T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5* 9.225 *B5,P3, P8*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, S12*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.675 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Feb. 9, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Chicago, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING — **Base discounts (net) f.o.b. mills. Base price about $200 per net ton.**

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

(Effective Feb. 9, 1960)

TOOL STEEL

F.o.b. mill.

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, C4, A3, J2*) 10 pct	Plate (*L4, C4, A3, J2*) 15 pct	Plate (*L4, C4, A3, J2*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 44.20; 1 side, 36.80.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	15.35
Cleveland *R3*	.....	.....	.....	10.10	.....	.....
So. Chicago *R3*	.....	.....	.....	.....	.....	.....
Ensley *T2*	5.75	6.725	.....	10.10	6.875	.....
Fairfield *T2*	.....	6.725	.....	.....	6.875	.....
Gary *U1*	5.75	.....	.....	10.10	.....	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	6.75	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Ironton, O., f.o.b.	30.50
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

LAKE SUPERIOR ORES

61.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	GRAPHITE Length (In.)	GRAPHITE Price	CARBON* Diam. (In.)	CARBON* Length (In.)	CARBON* Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$109.00
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Balt.	103.00

Magnesite Brick

Standard, Baltimore	$140.00
Chemically bonded, Baltimore	119.00

Grain Magnesite

St. ⅜ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Feb. 9, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Base Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Am'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	175	192	...	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	9.10	9.775
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4***...	173	190	177	212	196	9.00	9.70
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.775
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	...	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9*	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	187	217	198†	9.25	9.80†
Monessen *P6*	.....	.....	.....	.....	193	8.65	9.325
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.60	10.15
Rankin, Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50†
Sparrows Pt. *B3***	175	.....	.....	214	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 11-12¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. *G4*	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Chicago	.....	.....	.....	15.60	.....
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	.....	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

Iron Powders

Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.50
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

Copper Powders

Electrolytic, domestic	48.25
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25
Bronze	47.20 to 51.50
Chromium, electrolytic	$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	$3.60 to $3.95
Nickel	$1.05 to $1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	$1.07
Stainless Steel, 316	$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	$11.25
Tungsten	$3.15 (nominal)

* F.O.B., shipping point.

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
½" and smaller x 3" and shorter	55	57	61	62
⅝" diam. x 3" and shorter	47	49½	54	55
¾" thru 1" diam x 6" and shorter	37	39½	45	46
¾" thru 1" diam. longer than 6" and 1½" and larger x all lengths	31	34	40	41
Rolled thread, ½" and smaller x 3" and shorter	55	57	61	62
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts ½" and smaller x 6" and shorter	48	50½	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

C. P. Hex, reg. & hvy.

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

Hot Galv. Hex Nuts (All Types)

¾ in. and smaller	41

Semi-finished Hex Nuts

¾ in. or smaller	62
⅞ in. to 1½ in. inclusive	56
1⅝ in. and larger	51½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller	65

Rivets

Base per 100 lb

½ in. and larger	$12.85

Pct. Off List

7/16 in. and smaller	15

Cap Screws

Discount (Packages)

Full Finished H. C. Heat Treat

New std. hex head, packaged	Full Case
⅝" diam. and smaller x 6" and shorter	54 / 42
¾", ⅞", and 1" diam. x 6" and shorter	38 / 23
⅝" diam. and smaller x longer than 6"	.. / ..
¾", ⅞", and 1" diam. x longer than 6"	.. / ..

	C-1018 Steel Full-Finished Cartons	Bulk
¼" through ⅝" dia. x 6" and shorter	59	48
¾" through 1" dia. x 6" and shorter	45	32

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 7/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Discount Mach. Screws	Stove Bolts
Cartons	60	60
Bulk		
Quantity		
To ⅛" diam. incl. — 25,000-and over	60	..
5/16 to ½" diam. incl. — 15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

	Discount Hex	Square
In Cartons	16	19
Quantity		
In Bulk		
⅜" diam. & smaller — 25,000-and over	15	16

STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24	.....	.....	.....	.....
Baltimore**	.5.10	9.90	10.10	10.16	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.20	10.46	10.91	9.79	10.00	9.59	13.14	16.76	.....	.....	.....
Boston**	.10	10.52	11.27	11.87	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	10.25	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.16	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69[1]	9.89	11.09	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.65	9.65	.....	10.85	9.65	9.35	8.90	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	8.74	10.27	11.37	9.05	9.44	9.46	9.54	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95[1]	11 55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12.11	.....	.....	.....	.....
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.45	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.30	9.35	10.99	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.88	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95[2]	11.65	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.87	10.73	11.48	10.53	8.79	9.54	8.96	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	8.95	9.46	10.69	10.47	8.75	9.48	8.85	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—½" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2¾"; cold drawn—15/16" to 2⅜" round; Hot-rolled 4140—⅝" to 2⅜" round, cold drawn—15/16" to 2⅜" round.

†† 10¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter.

(Effective Feb. 9, 1960)

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	48.00
Electrodeposited	40.00
Brass, 80-20, ball anodes, 2000 lb or more	53.00
Zinc, ball anodes, 2000 lb lots	19.75
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carton, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.30

Tin, ball anodes $1.05 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	65.90
Copper sulphate, 100 lb bags, per cwt.	27.75
Nickel salts, single, 100 lb bags	36.00
Nickel chloride, freight allowed, 100 lb	45.00
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.70
(Philadelphia price 25.00)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	45.50
Chromic acid, flake type, 10,000 lb or more	30.44

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31–0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01–15.50), $101.00; Keokuk (14.01–14.50), $89.00; (15.51–16.00), $92.00. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.); $64.00.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*, Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge, Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

(Effective Feb. 9, 1960)

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Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 37.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 36.75
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	28.25	14.60
Ton lots	33.50	16.05
Less ton lots	35.10	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.70
Ton lots packed in bags	16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19%	$98.00	$96.00	$100.50
19-21%	100.00	98.00	102.50
21-23%	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk	34.25
Ton lots, palletized	36.25
250 to 1999 lb	39.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk	11.60
Ton lots, packed	13.25
Carloads, bulk, delivered, per lb of briquet	14.00
Briquets, packed pallets, 2000 lb up to carloads	16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
	90% Si....	20.00	

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective Feb. 9, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade

0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon,

0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down

packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49

bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk..	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20

F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

TYPICAL FOR MILL & REEL DRIVES

(2) 3500-K.W. Al. Chal. 5-unit Sets of (2) 1750-KW Gen., 350/700-VDC. (1) 5000-H.P. Syn. Motor, 13800/6900/4160-V., 3 ph., 60 cy. (1) 40-KW & (1) 10-KW Exciters.

(1) 600-K.W. Gen. Elec., 3-unit Set of (2) 300-KW, 250-VDC Gen. & (1) 750-HP Syn. Motor 4160/2300-V., 3 ph., 60 cy. & Magnetic F.V. Starting Cubicles.

(1) 200-K.W. Gen. Elec. 3-unit Set of (2) 100-KW Gen., 250-VDC, B.B. & 300-HP Syn. Motor 2300-V., 3 ph., 60 cy. Mag. F.V. Starting equipment.

STANDARD GENERAL PURPOSE SETS

QU.	KW	MAKE	D.C. VOLTS	A.C. VOLTS
1	2400	G.E.	250	4600/2300
1	1500	G.E.	250	4600/2300
1	1250	G.E.	132/265	4160
2	500	Whse.	280	4000/2300
1	400	G.E.	275	4000/2300
1	300	G.E.	250	4000/2300
4	250	Whse.	250	2300
2	200	G.E.	250/275	4000/2300
2	150	G.E.	250	440
1	125	G.E.	250	440
1	100	G.E.	250	440

(1)—1250-KVA Whse. Hi-Cycle Frequency Set, 800-V., 960 cycle with 1875-HP syn. motor, 2300-V., 3 ph., 60 cy. with all switchgear.

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HOT WORK DIE

SIZE	TRADE NAME	WEIGHT
7" Rd	Pressurdie #3	41,000#
5¼" Rd	Hot Form #2	48,500#
4" Rd	Chro-Mow	2,700#
3½" Rd	Chro-Mow	28,000#
3½" Rd	Hot Form #1	12,800#
1⅛" RG CG	Carpenter #883	10,000#

WATER HARDENING

SIZE	TRADE NAME	WEIGHT
5¾" Rd	"CFS"	17,700#
5" Rd	Leco	5,900#
4¼" Rd	"CFS"	6,100#
4⅛" Rd	Crucible Dbl. Spec.	14,700#
3" Rd	Carp. "K.W."	24,000#
.655 Rd.	AMS 5132	16,000#
1¾" x 1"	Silver Star	33,300#
1½" x 1	Silver Star	1,700#

OIL HARDENING

SIZE	TRADE NAME	WEIGHT
4" Rd	Vibro	31,000#
1¾" x 2"	"711"	6,000#
⅞" Rd	"711"	12,500#
9/16" Rd	Magic Chisel	44,700#
7/16" Rd	"711"	1,980#

All the items listed are NAME BRANDS—Fine Quality Tool Steels—Send For Complete Description List

GLOBE TRADING CO.

1815 Franklin St., Detroit 7, Mich.

WOodward 1-8277

Chicago Sales Climb, But Not as Expected

Used machine dealers in the Chicago area report sales are again moving up.

However, the brisk pace expected in January did not come to life.

■ Used tool sales, while moving at a strong pace, aren't showing quite the early pickup some dealers had expected. The same trend is expressed in the rebuilder branch of the industry. Some sources report they are actually working at slightly less than the levels they hit in December.

Thus far there's been no great cause for alarm. The industry reports its inventories are in relatively good balance. And it could sustain any further advances in business in the February-March period. Inquiries are up at the local level, and dealers in the Midwest are getting a fair movement of material to other areas. West Coast buying activity has been particularly good recently. A number of inquiries are beginning to crop up from Southern areas.

Year Forecast—How about the long-range outlook? Midwesterners feel they'll have a good year in 1960, probably exceeding 1959 levels. This is well worth noting, since 1959 sales were good, and were not heavily affected by the strike. At least not as heavily as some eastern tool markets.

Demand is holding. If there's any drawback in the total market picture, it's simply that the pickup hasn't been quite as fast as had been expected. Heavy machine tools are moving well. Milling machines, heavy lathes, drill equipment, and even some foundry equipment are moving out on new orders. Sheet and plate fabricating equipment is very strong, as it usually is in the spring months. Light, general purpose, tool room equipment is moving at the volume it hit in December.

Good Cash Reserves — Another steadying factor: The highly touted credit shortage hasn't greatly affected current business levels, most dealers feel. In the sharp credit tie-up of 1955, payments were heavily extended. Customers were slow to bring in cash. Dealers found themselves losing operating capital and had a tough time keeping up their inventory levels as a result.

Cash reserves in dealers' hands seem fairly good at present, and on-the-floor inventories of equipment are strong. If dealer volume falls it will not, as it was in 1956, be the result of a credit shortage. With these preventatives at hand, the average dealer appears to feel that he needn't worry too much about tight money over the first two quarters of 1960.

Gains Less Brisk — Chicago dealers are still building stocks in their shops. However, the pace seems a little less brisk than during the November-December period. Dealers indicate they would go further afield in an attempt to boost stocks at a faster pace if they find February sales begin moving up.

COMPRESSORS

Rebuilt by American Air

100 CFM 125 psi 6 x 7 Ing. or Worth.
138 CFM 100 psi 7 x 7 Ing. ES-1
142 CFM 125 psi 6-6 x 5 x 5 Worth. M25
183 CFM 150 psi 7 x 7 Joy WG9
191 CFM 300 psi 9-4¼ x 9 ES-2
194 CFM 125 psi 7-7-6 x 5 Worth. M40
234 CFM 100 psi 9 x 9 Ing.—Worth.
268 CFM 500 psi 10-4¼ x 10 Ing.
290 CFM 75 psi 10 x 9 Ing. ES-1
364 CFM 100 psi 10 x 9 Joy WG9
455 CFM 100 psi 13½-8 x 10 Sull-WJ3
465 CFM 100 psi 12 x 11 Ing.
502 CFM 125 psi 12 x 13 CP
585 CFM 100 psi 15-9¼ x 12 Ing. 3-60-4160
628 CFM 100 psi 14 x 13 Ing. ES
676 CFM 100 psi 15-9¼ x 12 Ing. XRB-Worth.
870 CFM 110 psi 17-10½ x 14 Ing. XRB
2506 CFM 50 psi Penn. DEI-19-19 x 14
3078 CFM 110 psi 30-18 x 21 Ing. PREZ
300 HP EM Syn Motor 3-60-2300
500 HP 3-6-2300/4000 Syn
Portable Gas-diesel 60"-600'

AMERICAN AIR COMPRESSOR CORP.
DELL AND IRON STREETS
NORTH BERGEN, N. J.
Telephone UNion 5-4848

VARIABLE VOLTAGE DRIVES

3 PHASE 60 CYCLE

Quan.	Size	Description
2		3000 HP DC MOTORS—525 V. 600 RPM Whse. M.G. Sets—2500 K.W. Whse., 2300/4160 V.
1		2750 HP DC MOTOR 450 V. 300 RPM Elliott 2200 K.W., Gen. Elec. 3 unit 450 V. DC Gen. with 3000 H.P. 720 RPM, 2300 V. AC Motor and Etc.
1		2250 HP DC MOTOR 600 V. 400/500 RPM, G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1		1500 HP DC MOTOR 600 V. 600 RPM Whse. M.G. Set. 1500 K.W. G.E. 13200 V.

For listing of Motors, Generators, Transformers. M.G. Sets, Rectifiers, Mill Motors, etc.

See last week issue.

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RE-BUILDING AT ITS BEST

Miles' rebuilding adds extra life to machine tools. For example, notice the nitrided steel wearing plates installed on this header slide from a 3" National upsetter.

Drill, Driver, No. 15½ Foote Burt vertical, hydraulic, for mounting customer's own multiple head with motor (2)
Drill, Radial, 5' arm 13" column Cincinnati Bickford super service.
Drill, Sensitive, Leland Gifford 4 spindle motor on spindle, hydraulic, late
Drill, Upright, 22" swing No. 221½ Barnes box column MD, new 1945
Drill, Rotomatic, 12 spdl. Davis & Thompson vertical, 20 HP, new 1946
Engraver, Model BL2416 Pratt & Whitney Keller, 3 spdl., late
Gear Tester, No. 13 Gleason universal, 4 speed, MD, late
Grinder, Centerless, No. 2 Cincinnati Filmatic for nut and bolt grinding, new 1953-54.
Grinder, Cylindrical, 10" x 24" Landis type C hydraulic, universal
Grinder, Cylindrical, 18" x 36" Cincinnati universal, Filmatic bearings
Grinder, Disc, 22"-24" Model 221 Hanchett opposed wheel double disc
Grinder, Internal, No. 72A5 Heald Universal cross sliding headstock, "T" base
Grinder, Surface, 8" x 24" No. M3 Abrasive, late
Lathe, Automatic, No. 3D Gisholt Simplimatic, hardened ways, late
Lathe, Engine, 16" x 58" cc American Pacemaker, GH, late
Lathe, Engine, 25" x 72" cc Axelson Model E heavy duty, geared head, 1944
Lathe, Engine, 25" swing 18" cc Axelson Model F, heavy duty, geared head
Lathe, Turret, 4L Gisholt heavy duty saddle type, cross feeding turret 9¼" hole in spindle
Lathe, Chucking, 60" Model T Lodge & Shipley right angle, Timken bearing, new 1952
Mill, Model 5H Kearney & Trecker Milwaukee, plain, vertical attachment, late
Mill, 72" swing Ingersoll two spindle rotary table, continuous
Press, Coining, 600 ton No. 664 Toledo knuckle joint, tierod rame
Press, High Speed, 110 ton Model 675B Bliss high production, double crank
Press, Straight Side, 1000 ton Model 10C Ajax all steel eccentric shaft, forging, 1942
Saws, 10½ x 10½" No. 2 Motch & Merryweather circular cold metal, 10 HP
Shaper, 28" G & E Industrial, plain, late, heavy duty
Upsetter, 2" National air clutch and brake
Upsetter, 4" National high duty
Upsetter, 4" National with air clutch and air brake

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25 Ton Industrial 60' Boom Crane
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RAILWAY CARS and REPAIR PARTS
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1, G. E. 80-Ton, 500 H. P., Std. Ga.
10, 70-Ton COVERED HOPPER CARS
1, 125-Ton RAILROAD TRACK SCALE

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eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

HORIZONTAL DRILLS
2 spindle No. 410 W. F. & John Barnes, m. d.
No. 410 W. F. & John Barnes, Horizontal Boring & Drilling Machine, m.d.
No. 410 Barnes Single Spindle Deep Hole, m.d.
No. 2 Avey Style MA1, with horizontal operation.
No. ½8x50" Pratt & Whitney Gun Barrel Rifling, Model M1821, m.d., latest
No. 1½"x105" Pratt & Whitney, 2 spindle Hydraulic Deep Hole Drill, Model 973, m.d. latest
No. 1½"x105" Pratt & Whitney, Model M1825, 2 spindle Gun Barrel Rifling, m.d.
No. 1 Model M509 Pratt & Whitney 2 spindle Deep Hole Drill, belted m.d.
¾"x40" Bausch Double Horizontal Drilling Machine, m.d.
No. 445 W. F. & John Barnes Independent 2 spindle Deep Hole Drill & Boring Machine, late
No. 2F1 Natco Horizontal Boring & Drilling Machine
Natco, Holesteel Model, m.d.
Natco Horizontal Drill, 2 opposed B4F2 Head, 1943
No. 2 LeBlond Deep Hole Borer, m.d., 1943

MULTIPLE SPINDLE DRILLS
2 spindle No. 201¼ Barnes, m.d. H.D.
2 spindle No. 6 Colburn Manufacturing Type H.D., separate m.d. to ea. spindle.
3 spindle 28" Cincinnati-Bickford Upright Drill, m.d., No. 4 M.T.
4 spindle No. 201¼ Barnes H.D., m.d.
6 spindle Model M1613 Pratt & Whitney In Line Vertical Drill
6 spindle W. F. & John Barnes Vertical Drilling Machine, m.d.
No. 924 Barnes Vertical Boring, Drilling, Facing & Reaming Machine

UPRIGHT DRILLS
Model H3 Barnes Hydram, m.d.
Model H4 Barnes Hydram, m.d.
20" Barnes, m.d., 1940
20" Barnes All Geared Self-Oiling Drill & Tapper, m.d.
21" Cincinnati-Bickford, single spindle, m.d.
21" Cincinnati-Bickford, H.D., m.d., late
No. 2AL Natco Holesteel Vertical, m.d.
No. 2 Colburn Mfg. Type, m.d.
No. 201¼ Barnes Single Sp. Upright Drill & Tapper, m.d.
No. 25 Foote-Burt, m.d., H.D.
No. 314A Baker Universal Quick Change Type, H.D., m.d.
No. 513 Baker, m.d., belted m.d.

GEAR GRINDING MACHINES
6x20" Fitchburg Hydraulic Spline & Gear, m.d.
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1—250# LECTROMELT—185 KVA
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1—3 ton SWINDELL Top Charge—Late
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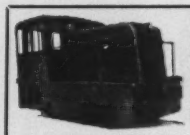

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1—Air Compressor, I-R, 1075 CFM @ 125#, 3 cylinder, diesel engine driven by 6 cylinder engine, accessories.
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FOR SALE
Teflon scrap in film form.
Reply to
BOX H-23
c/o The IRON AGE, Chestnut at 56th, Phila. 39

FOR SALE

1 Mill Type Bldg. 600'0 x 78'0 with 25/5 Ton Overhead Crane, 65'0 cc of Rails, Lift 50'0.
1 Mill Type Bldg. 382'0 x 67'0 with 15 Ton Crane, 65'0 cc of Rails, Lift 47'0.
1 Crane Runway 500'0 x 55'0 with 15 Ton Overhead Crane, 50'0 cc of Rails, Lift 47'0.

Will sell all or part.

BOX H-21
c/o The IRON AGE, Chestnut at 56th, Phila. 39

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NEW *WANTED* USED
Structurals, Plate, Pipe and Tubing
Consumers Steel & Supply Co.
P. O. Box 270, RACINE, WISCONSIN

LARGEST BUYERS
in any quantities
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Structurals—All Types of Steel
Pipe—Tubing—Tanks—Boilers
CALUMET IRON & SUPPLY CO.
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WANTED TO PURCHASE
Metalworking or fabricating plant
REPLIES CONFIDENTIAL
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WANTED—DESIGN ENGINEER
Well established manufacturer of gas-fired industrial heat treating equipment and appliances desires a designer and engineer with at least ten years experience with similar company. Must be an experienced draftsman capable of supervising drafting and engineering department. Send resume of education, experience, also salary requirements and references to
BOX H-24
c/o The IRON AGE, Chestnut at 56th, Phila. 39

CHIEF ENGINEER — Graduate engineer preferred, or other with comparable experience and background will be considered, to supervise Engineering Department engaged in all phases of design, manufacture, plant layout of foundry equipment, and installation of complete foundry automated molding lines of foundry equipment. Experience and proven background in machine design and foundry operation essential. Send complete resume to Box H-20, c/o The IRON AGE, Chestnut at 56th, Phila. 39.

Situation Wanted

FORGE SHOP SUPERINTENDENT or General Foreman—32 years forging experience all phases, in ferrous and non-ferrous materials. I am interested in forging or allied industry. Box H-16, c/o THE IRON AGE, Chestnut at 56th, Philadelphia 39.

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CIRCULAR COLD SAWS (2) SERIAL NOS. 42135 & 42185, MFD. 1942, WITH MOTOR AND CONTROLS.

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FOR SALE
One 48" Friction Saw, water cooled. 50 HP 220-440 Motor, all starting equipment. 5 extra blades, excellent condition.
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LIFTING MAGNETS
A complete magnet service. Magnets, new & rebuilt, generators, controllers, reels, etc.
Magnet specialists since 1910
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This section appears weekly and carries announcements of metalworking materials or used machinery and equipment wanted.

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ARNOLD HUGHES COMPANY
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WOodward 1-1894

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One press or entire stamping or forging plant. Write or phone in confidence.
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GROVEHILL 6-7474

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600 WEST JACKSON BLVD.
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Buyers of Surplus Steel Inventories
39 Years of Steel Service

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Help Wanted

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TO HANDLE LINE OF SWEDISH HAND AND POWER HACKSAW BLADES. MUST HAVE FOLLOWING AMONG STEEL MILLS, FOUNDRIES, FABRICATORS, ETC. GOOD COMMISSION. REPLY
BOX H-19
c/o The IRON AGE, Chestnut at 56th, Phila. 39

Project Engineer preferably with engineering degree and about ten or more years experience in plant engineering. Should have foundry or steel mill background and no aversion to part time drafting design work. Position is one of real challenge, of much potential and will pay well. The opportunity is with a leading steel foundry in the East. Please furnish resume to
BOX H-18
c/o The IRON AGE, Chestnut at 56th, Phila. 39

HELP WANTED
Pittsburgh area—established representative or retired man with experience in refractories or steel plant hot metal operations. Commission plus expenses.
Write: James A. Clark, Sales Manager
Metallurgical Enterprises
Prudential Building
Buffalo 2, New York

SALES and SERVICE ENGINEER
Wanted by Detroit firm due to expanding sales of imported and domestic machine tools, and stamping & forging equipt. Liberal salary plus commission to thoroughly competent man. Furnish full particulars in confidence to Box H-22.

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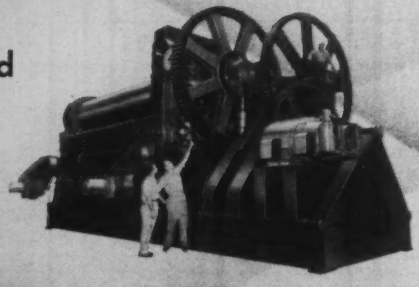

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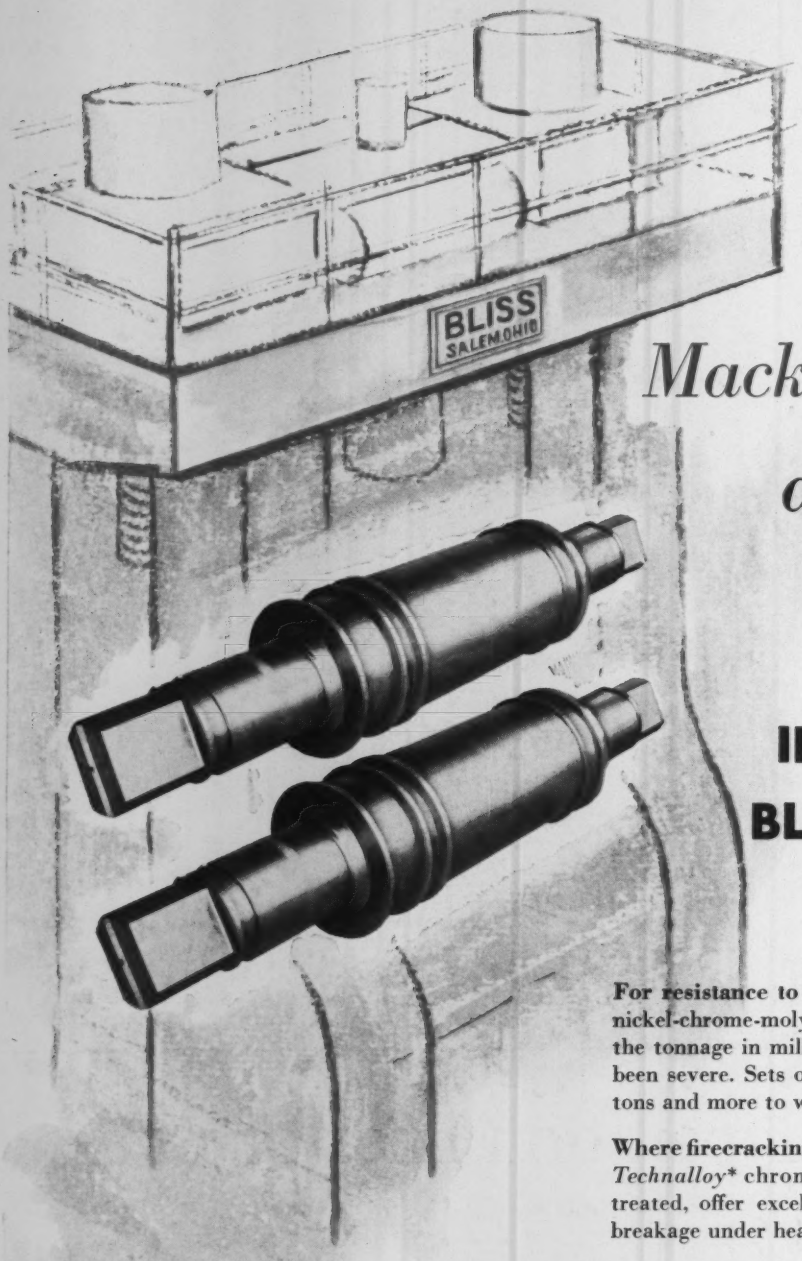

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